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MATERNAL WELFARE.[1]

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MATERNAL welfare and the problems associated therewith have created considerable public interest in recent years. A national maternal mortality rate between 4 and 5 per thousand births is naturally considered to be too high, and there can be no question that some of these fatalities could be prevented by better organization. Comparison with the maternal mortality rates of other countries does not help very much in the solution of the problem of diminishing the numbers of mothers lost. A very cursory examination of foreign statistics shows that until a universal method of recording maternal deaths is adopted by all the nations concerned, comparisons are useless.

In the Supplement to *The British Medical Journal* of December 7, 1935, dealing with the memorandum regarding a national maternity service, the Council of the British Medical Association is reported as endorsing the views expressed at the annual meeting, 1935, at which the following resolution was passed:

> That the British Medical Association regrets that the question of maternal mortality has become the subject of widespread political discussion, receiving great publicity in the lay Press. Maternal mortality is a scientific and administrative problem which deserves careful and scientific study, but in the experience of practising doctors, the publicity which it is receiving today is tending to terrify child-bearing women and is, in itself, a cause of increased mortality.

A Scottish official report also lays stress on this aspect; for the writers say:

[1] Chairman's address, delivered before the Section of Obstetrics and Gynæcology of the New South Wales Branch of the British Medical Association on November 17, 1937.

There has been an unfortunate tendency of late to over-emphasize the danger of child bearing, and it is desired to take this opportunity to stress publicly the facts that pregnancy and parturition are natural physiological processes, and that departures from the normal occur only in a small proportion of cases. It is difficult to assess the reaction caused in women by fear unnecessarily aroused by indiscreet public emphasis on accidents of child bearing. There is no suggestion that scientific inquiry should be discouraged, but it is believed that disproportionate publicity of untoward results may itself aggravate a problem already sufficiently difficult.

I feel sure that most Australian obstetricians will agree with these two quotations, and it is to be hoped that the subject of maternal welfare will never again receive the injudicious publicity, with its inevitable birth phobia, which it did a year or so ago. At that time I suggested to the Council of the New South Wales Branch of the British Medical Association that a special subcommittee should be formed to consider the question of maternal and infantile welfare and to make a report to the Council with certain recommendations. The Council approved of the suggestion and the subcommittee was duly constituted. After a few meetings it became obvious that the questions involved were so enormous that only a modified conception of my original idea could be carried out. It was apparent that in order to obtain the required information a whole-time officer would be needed, in fact, almost a Royal Commission; so, as it was impossible for men in busy, active practice to give up the time required for this, it was decided to limit the scope of our recommendations considerably. This work is now nearing completion and will soon, I trust, be finished. The committee had as members Professor J. C. Windeyer and Dr. E. S. Morris, both of whom recently had the opportunity of seeing a considerable amount of work in Europe and America from the point of view of teaching and administration. On their return they were able to give us much valuable information. It is not my intention to discuss the work of the subcommittee, but rather to consider certain aspects of maternal welfare in general. First, then, I think we may all agree that maternal welfare is a scientific and administrative problem which deserves careful and scientific study. There is no doubt that a certain number of the maternal deaths can be prevented. The responsibilty for these deaths has to be borne by all concerned and not by one section only. It has been the fashion to blame the medical profession, the general practitioner in particular. The medical profession must be regarded as responsible in some cases; but it cannot be denied that the patient and the public in general are largely responsible for the present mortality rates. The public should also clearly understand that some mothers will lose their lives no matter what is done. No good purpose, however, will be served in attempting to shift responsibility; the essential point is to answer the question: "What means are available for providing an improved obstetric service?" They may be considered under the headings of: (i) better education, (ii) more thorough supervision of the patient, (iii) adequate facilities for treating every abnormal condition.

Better Education.

It is a common statement that the university should provide a longer and presumably better course of instruction for medical students in obstetrics. Under the heading of education, however, should be included the wider view of the education not only of the student, but also of the doctor, the nurse, the patient and the public.

Education of the Medical Student.

How does the present teaching of students compare with past methods and methods overseas? A comparison of the present-day teaching and the past shows that whereas the time allotted to clinical obstetrics used to be three weeks it is now twelve weeks: six whole weeks in residence in an obstetric hospital, and six weeks of three whole days per week. The twelve weeks comprise the main course of ten weeks during the fifth year, and the refresher course of two weeks during the sixth year. Clinical lectures and demonstrations used to be six in number, but now are fifty-one to each group of students.

The number of obstetric cases conducted by each student used to be twelve; now the average is thirty, and none less than the twenty required by the university by-laws. The number of cases witnessed used to be thirty or forty; last year the average has been 148. Formerly students were asked only to attend the actual delivery; now they are compelled to attend and write notes, not only on normal and abnormal cases during pregnancy, parturition and the puerperium, but also on the normal and abnormal infant.

By this course the student becomes conversant with normal pregnancy and parturition and all the more common complications. A student can only be expected to learn general principles; experience can come only with actual practice. So far as the student is concerned, it is difficult to see how any longer time can be allotted to obstetrics in the present medical curriculum unless the course is lengthened to more than six years. Professor Windeyer studied this aspect closely on his recent trip abroad, and found few places, if any, where the teaching was so detailed and so complete as in Sydney.

More time could be allotted to clinical obstetrics by having larger groups of students in residence; but larger groups are more difficult to teach. The smaller the group, the more thorough the personal instruction can be made.

As there are full-time chairs for the teaching of all the other subjects in the Medical School, there should be a full-time chair for obstetrics, possibly combined with gynæcology. Funds should be available for payment of research workers who would help in solving, not only local, but world-wide problems. At present, as there are no funds, there are but few or no workers.

Education of the Doctor.

The education of the doctor is increased by experience in the practice of obstetrics. This experience can be greatly helped by residence as a medical officer at one of the obstetric teaching hospitals, by attendance at courses of post-graduate lectures and demonstrations arranged by the New South Wales Post-Graduate Committee in Medicine, by the performance of a clinical assistant's duties at an antenatal clinic. It is a question open to discussion whether a hospital appointment as junior or senior resident medical officer should be of shorter duration so that a greater number could have the advantage of securing these positions. The present tenure is usually six months as junior and twelve months or longer as senior. If the appointments were made for three months for the juniors, as some of this time would have to be spent in the gynæcological and isolation departments, the actual time spent in the obstetric wards would be so short that a very imperfect experience would be obtained. With this arrangement the difficulty in working the hospital satisfactorily would be greatly increased. The disadvantages of this scheme, I think, outweigh the advantages. If funds were available for research workers in the hospitals it would be of very great value in stimulating the work of the whole hospital.

Education of the Nurse.

Ideally the obstetric nurse should be a general-trained nurse holding the double certificate. General-trained nurses, however, do not seem very keen to do obstetric work only. The standard of the obstetric nurse nowadays, however, is much higher than in the days of the half-trained handy woman, and when the longer period of training and better methods of training now in vogue are fully developed, the obstetric nurse should be efficient. More time could perhaps be allotted to the actual practice of palpation, so that the nurse would be able to recognize abnormal conditions earlier and send for medical help sooner. Refresher courses also are of great value in keeping the trained nurse in touch with more modern ideas.

Education of the Patient.

The patient should be educated to place herself under reliable supervision as early as possible in pregnancy, and it should be stressed that every pregnancy needs supervision, even if previous ones have been normal. Suitable instructions, warning the patient of dangerous symptoms or signs, should be available to every patient, and the need to report at once should be emphasized if any of these symptoms or signs appear. The patient should be encouraged to confide any of her fears or anxieties to her doctor, so that she may approach the time of the labour with confidence. It is the unknown that people fear, and instruction in simple language of what labour actually is helps to dispel this fear.

Education of the Public.

The public needs education about the importance of obstetrics. Consider the position of obstetrics in the mind of the community today. Lord Nuffield, one of the greatest philanthropists the world has known, has donated enormous monetary gifts to the various Australian States, yet it apparently never entered the minds of those who advised him about the distribution of his gifts that there was an urgent need to try to save the lives of mothers in child-birth, and that the way to do this was to have research into the causes of maternal mortality; or that the hospitals which were trying to save the mothers needed monetary help to secure the equipment which was a vital need if obstetrics were to be conducted along modern scientific lines.

The munificent Bosche bequest to the University of Sydney helped medicine and surgery; but who can point to any similar bequest to obstetrics? The fact remains that the public in general does not realize that obstetric problems require careful scientific investigation, and that to make this possible scientific apparatus in properly equipped laboratories and a scientifically trained personnel must be provided and maintained. I am not unmindful of the benefactions to obstetric hospitals for the maintenance of beds and for the general upkeep of the hospitals. All honour to those who have made them. But the need for developing the scientific investigation of obstetric problems has been almost completely neglected, and this point I believe needs stressing if obstetric results are to be improved.

The first step in improving obstetrics is to provide hospitals where patients in need of more skilled attention than can be provided in their own homes, could be admitted and treated, and which can be utilized in teaching the first principles of obstetrics to nurses and students. This has been done to a certain extent. The second step is to provide these hospitals with the means of investigating the more difficult problems. The board of directors of the Women's Hospital, Crown Street, Sydney, realized this need, and some time ago appointed a biochemist and pathologist, working full time, and then equipped an X ray department. But this work is sadly hampered by lack of necessary space and lack of money. Until greatly enhanced private, public or governmental support is forthcoming both for the Women's Hospital and for the other obstetric hospitals, progress forward on this step will be greatly hampered.

The third step is the provision for research; it does not yet appear to be visible on the obstetric horizon. I am well aware that the Government finds difficulty in supplying the hospital needs of the community as a whole—needs which have been sadly neglected in the past, and which have been courageously tackled by this Government and its predecessor; but if each year a sum is put aside to encourage investigation into only one aspect of maternal mortality, a step would be taken in the right direction. Under the stimulus of research the standard of education must of necessity be raised and better results will be obtained.

More Thorough Supervision of the Patient.

Antenatal Clinics.

When the importance of antenatal supervision was first brought prominently before the profession and the public, it was thought that there would be a great improvement in maternal mortality rates. Ballantyne, who was a strong advocate for it, had great hopes for better results. But in spite of its adoption, the mortality rate has not been greatly affected. What is the reason? The reasons may be summed up as follows: some women will die no matter what is done; other patients who die are chiefly those who have either had no supervision at all or very inadequate supervision. What antenatal supervision can do is shown by the fact that during the six years commencing July 1, 1931, there have been at the Women's Hospital, Crown Street, 31 deaths from 13,721 booked cases—a mortality rate of 2·259 per 1,000. The term "booked cases" refers to all patients who have attended the antenatal department at least once before being admitted to hospital. Some of these patients would not have died if a stricter follow-up system had been available to see that patients with toxæmia were made to report when ordered to do so, for some patients admitted with severe toxæmia had not attended for varying periods up to five weeks from their last attendance. The appointment of an almoner would help to make patients report.

There is thus no doubt that antenatal clinics are of very great value in lessening maternal mortality; but at the same time it must be stressed that not all antenatal clinics come up to the required standard.

In the first place, it is essential that of those who carry out the antenatal supervision, one at least must be a well-trained obstetrician thoroughly conversant with obstetric abnormalities and familiar with modern ideas. Associated with him can be younger practitioners who are keen to become proficient in this work and who would refer any doubtful patient for the opinion of the senior.

In the second place, there must be the closest cooperation between the antenatal clinic and the labour wards. Ideally, the attendant who supervises the antenatal period should be the one who conducts the labour. In this way observation becomes more accurate and judgement more mature. For this reason the general practitioner should be the one who carries out the antenatal supervision, because of his intimate knowledge of the patient's family and personal idiosyncrasies.

At the Women's Hospital, Crown Street, the record of observations made at the antenatal clinic accompanies the patient to the obstetric wards, and so continuity of observation is maintained, although different attendants are responsible. An unsatisfactory state exists when the antenatal clinic is not connected with the institution where the delivery takes place, for then it is difficult to get accurate information about the type of labour *et cetera*, and erroneous ideas tend to persist.

Thirdly, when large numbers attend an antenatal clinic there is danger that the work may be done superficially owing to lack of time to study each patient adequately. Also, it is easy to become slipshod, because abnormalities are comparatively rare. F. J. Browne says:

> In no department of medicine is one so liable to drift into careless ways and thus to miss the occasional abnormality, or the occasional sign of impending danger, and against this the antenatal worker needs to be constantly on guard.

Munro Kerr says:

> It is watchful care that is essential. The constant watchfulness on the part of those in attendance tends to slacken as in so many cases nothing abnormal occurs.

Fourthly, adequate antenatal supervision demands that inquiry should be made into the patient's family history, past illnesses, menstrual history, and obstetric history. Careful investigation should be made of the cardio-vascular, renal, digestive, respiratory and nervous systems *et cetera*. The pelvis should be measured, and at each visit routine recording of the patient's weight, blood pressure, and results of urinary examination and abdominal examination should be made. At all clinics the Wassermann test should be applied, and tests for anæmia are often required. The general health of the patient must be studied, particular attention being paid to the diet to see that this is suitable, calcium and vitamins being added when their use is indicated.

Dental care and oral hygiene must not be forgotten. A dental clinic attached to the large antenatal hospital clinics would be a very good thing; for the number of patients with unhealthy teeth and mouths is very great, and this is, I am sure, a contributory factor in the causation of toxæmia from which a large number of Australian women suffer.

Finally, a very important function of the antenatal clinic is to remove the fears and anxieties which have a great influence on the patient's health. Reassurance, sympathy and encouragement can do much to alleviate the fears which are very frequently present, but which the patient often tries to conceal.

Adequate Facilities for Treating Abnormal Conditions.

The obstetric teaching hospitals are still very poorly endowed with the laboratory and other scientific equipment which play an essential part in the diagnosis and treatment of disease in a modern general hospital. This is because having a baby is regarded as being a perfectly normal physiological process. So it is in the majority of cases; but, unfortunately, there are patients who are not fit to have babies, but who will persist in trying to have them. A large maternity hospital is called upon to treat a considerable number of pregnant women who suffer from acute or chronic disease of the heart or kidneys or other organs. Thorough investigation by modern methods is essential for good results to be obtained, and so laboratory and X ray equipment is necessary.

The public must realize this some time and supply the remedy. The sooner this is done, the sooner will obstetrics take its proper place in medical work and attract a greater number of workers, and this in itself will raise the standard of education, the necessity of which is so much talked about.

Abnormal conditions discovered in the routine antenatal supervision are usually dealt with by the patient's transference to hospital, where the investigations can be carried out and the appropriate treatment decided upon, or the advice of a consultant can be obtained. Provision requires to be made, however, for the acute sudden emergency usually due to severe hæmorrhage. These patients are often too ill to stand the journey to hospital. For this type a blood transfusion is very often necessary if life is to be saved. A blood transfusion unit which can at a moment's notice visit the patient's home and give the transfusion, needs to be organized. After the transfusion the patient can be moved to hospital if necessary. A unit could be attached to each of the hospitals and would be at the call of any doctor who needed its help.

The early recognition of puerperal sepsis by bacteriological examination of cervical smears and the immediate isolation of suspected patients are essential steps in preventing the spread of sepsis. I understand that the recognition of the hæmolytic stretococcus, type *A*, which appears to be the dangerous one in the puerperium, requires a certain amount of experience. There is need, therefore, for a unit or units trained in this work to be available. As a preventive measure masks should be worn as a routine during a labour by all those in the labour room. Droplet infection is now well established as a common cause of infection. Also persons with sore throats or any acute infection of the nose and throat should not be present at a labour. If a patient develops sepsis, all contacts should be investigated bacteriologically. More frequent consultations are advisable in difficult or abnormal cases. No one expects a general practitioner to be a specialist in surgery or medicine, nor should he be expected to be a specialist in obstetrics; yet the members of the public often expect him to deal with a most difficult condition single-handed. Practitioners sometimes hesitate to ask for a consultation for fear of loss of prestige, or because they fear the patient cannot meet the added expense. To overcome the latter objection it is suggested that a list of consultants should be compiled who would be willing to see genuine patients for a reduced fee, provided that some authority guaranteed the payment. Dr. Morris is at present trying to work out such a scheme.

The provision of a sterile outfit for labour at a cost within the means of poor patients would be most useful. This could perhaps be organized by the Hospitals Commission.

The provision of a convalescent home for mothers with babies is long overdue. Many mothers need a much longer time to recuperate than can be provided in hospital. Particularly is this the case with patients suffering from toxæmia or heart disease. If a convalescent home was available where they could stay until thoroughly recuperated, much of the poor health so frequently seen would be prevented. Poor health is one factor in undermining resistance in future pregnancies. The demand for painless labour carries with it an increased risk to mothers. The volume of work done to try to find safe methods shows how unsatisfactory most methods still are. A certain amount of pain in childbirth is unavoidable; but no mother should be expected to endure an unreasonable amount. The mother who will cooperate in a helpful manner usually suffers less than the one who demands complete relief from all suffering and who refuses to make any effort herself.

Meddlesome midwifery is still too often practised and is responsible for much trouble. The more natural delivery can be made and the less unnecessary interference, the better the results. Induction of labour is not always associated with the good results hoped for.

In concluding these remarks, which deal with one aspect only of this many-sided problem, I should like to draw attention to the necessity for appreciating the dangers of toxæmia of pregnancy, which account for about one-third of the total maternal deaths in New South Wales. Toxæmic symptoms even of the slightest should never be regarded lightly, for one never can tell when disaster will come.

EXPERIENCES IN EXCRETION UROGRAPHY.[1]

By B. L. W. Clarke,
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I desire to thank the committee of this congress for giving me the opportunity to address this meeting on a very interesting subject. As the time allotted is very short and the field so wide, I hope you will forgive me if I dwell too long upon what may be considered elementary details and omit any of the more important conditions.

Excretion urography is one of the more important of recent advances in radiology. It is a very simple procedure, and gives valuable information regarding renal function and renal pathology and other important details which are necessary in the successful treatment of diseases of the urinary tract.

Earlier attempts at excretion urography were made about 1929, but these did not always meet with success, mainly owing to the large amount of solution and the low percentage of opaque material in this solution. The length of time taken over the injection allowed very little concentration of the dye in the renal tissue. Mishaps with the needle were frequent, particularly with nervous patients, and once the dye got into the soft tissues thrombosis and even abscess formation were frequent. How-

[1] Read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

ever, with more recent investigation on the part of the chemists, the dye is now distributed in a smaller quantity in a more concentrated form.

"Abrodil Forte" and "Uroselectan B", which I use, for instance, are put up in phials with a capacity of twenty cubic centimetres. The iodine concentration is approximately 51·5%. Iodine is one of the radio-opaque substances which enable us to obtain urograms. It is not my intention to discuss the chemical and physical qualities of these drugs, beyond saying that they are usually very well tolerated by the patients.

Preliminary bowel medication is, in my opinion, unnecessary. In fact, it may even prevent satisfactory radiographs. It has been my practice for several years to refrain from the administration of purgatives of any sort, and also to prohibit absolutely the use of enemata. However, in the event of obstinate constipation, and in some instances when radio-opaque material, like bismuth, has been given by mouth, purging is necessary to clear the alimentary canal. A period of approximately twenty-four hours should then elapse before the excretion urography is attempted.

Accumulations of gas in the bowel are frequently met with after purgation, but probably less so after the administration of castor oil or vegetable laxatives. I am of the opinion that, provided the patient has normal evacuation of the bowel, the urographic examination may be carried out at any time. In normal evacuation I include individual variations from the physiological, or rather sociological, standard of normality for the individual in this respect.

Accumulations of gas in the bowel, usually the colon, do cause difficulty in obtaining satisfactory radiographs, but it is often an equally difficult problem to eliminate the gas. Furthermore, it is notorious how rapidly gas will accumulate, particularly in nervous patients. It is not infrequent, when comparison of two films taken at intervals of ten minutes, is made, to find the gas contents of the bowel quite different in each case.

Gas is almost always found in (*a*) patients suffering from renal colic, and (*b*) patients who are confined to bed.

Hypodermic injections of morphine given to relieve renal colic appear to cause accumulations of gas, probably owing to the inhibition of peristalsis. On the other hand, patients suffering from renal colic frequently have large collections of gas, although morphine has not been administered; and frequently those patients who have been confined to bed for some considerable time have large collections of gas, which are probably due to the general loss of tone of the voluntary and the involuntary muscles. I have tried a number of means of eliminating this gas without a great deal of success.

The patient is suitably dressed and placed on the X ray table, where he is made as comfortable as possible. The necessary instruments and material should be prepared in an adjoining room so as to eliminate all unnecessary noise and movement, and only those actually concerned with the procedure should be admitted into the X ray room. Children and nervous adults very often behave themselves very much better in the absence of parents, relatives or even the family doctor.

A scout film of the renal region is always taken first to serve as a control. This may reveal nothing at all, or even a calculus making a complete cast of the renal pelvis and calyces. Personally I think it is better to use one large film rather than several small films, as this eliminates unnecessary noise and the possible air of mystery, and may help to keep the patient calm.

A suitable vein is selected, usually in the cubital fossa, and an area of skin is carefully sterilized. Ether is excellent for this purpose. I consider it is advisable to explain some of the procedure to the patient to allay suspicions. If the cubital fossa veins are selected, the assistant should get a firm grip of the fleshy part of the arm with one hand and the wrist joint with the other, and hold the extremity in full extension. The veins usually show up without being unduly distended. The tourniquet should not be used. The sharp needle is rapidly pushed obliquely through the skin and then inserted into the vein. The dye, which has already been heated to body temperature, can now be steadily injected from the twenty cubic centimetre syringe, preferably one that has an eccentric centre.

The actual insertion of the needle and the intravenous injection are as a rule not painful; but should any dye get into the soft tissues, pain is felt immediately with "Uroselectan", but not always with "Abrodil". When leakage occurs, the injection should cease, because the dye is slowly excreted from the soft tissues, and it causes intense pain, which tends to inhibit urinary secretion. Abscess formation may occur around the site of injection. The after-effects of the successful intravenous injection are usually negligible. Occasionally a patient may be susceptible to iodine, which results in pain of a varying degree travelling up the arm. In one case of my series almost immediate thrombosis occurred, extending from the elbow to the shoulder. Sometimes vomiting may occur, possibly because the solution is too hot or too cold, or in the presence of serious renal disease. The actual injection should take about ninety seconds for twenty cubic centimetres. This causes least inconvenience to the patient.

A firm binder about twelve inches wide is then tightened across the abdomen and routine radiographs are taken at intervals of eight, fifteen and thirty minutes after the injection. Variations from this depend upon any pathological condition which may subsequently be revealed. The binder appears to assist congestion of the renal veins, and at the same times "flattens out" the abdomen and prevents movement during the exposure. Films are best

taken in full expiration, as there is less chance of movement than in full inspiration.

It is rather remarkable that a number of patients, particularly of the hospital class, frequently vomit if the injection is made early in the day. I prefer to wait until about two hours after breakfast. Vomiting in the afternoon is not very common. When vomiting does occur the patient usually complains of a distressing feeling in "the back of the throat", and at most it only lasts a few minutes. In the majority of cases there are no after-effects, except a little stiffness in the arm for about half an hour, provided, of course, no dye has been injected into the soft tissues.

Excretion urography under a general anæsthetic is usually a failure because the urinary excretion upon which the success of the subsequent film depends is inhibited; and even radiography in the post-anæsthetic state of restlessness, vomiting and incoordination is extremely difficult and in fact may be impossible. In only one case of my series was this successful, and that some years ago. The patient was a child with a large polycystic kidney, which was revealed on a film taken about two hours after recovery from an anæsthetic. Earlier films revealed no dye at all in either kidney.

A hypodermic injection of morphine beforehand to relieve renal colic also inhibits urinary secretion and increases the difficulties by producing variable gas accumulations.

In a normal kidney evidence of the dye and of reasonably good concentration in the renal pelvis and calyces is found within about eight minutes. In fifteen minutes the dye intensifies the renal shadow and outlines the renal pelvis, calyces and upper part of the ureter quite well. Films taken later reveal the lower part of the ureter and the bladder. One expects to find the secretion rate in a normal subject equal on both sides.

It is difficult to give an accurate description of a normal renal pelvis. It is usually described as conical shaped, sloping obliquely downwards towards the mid-line, with the apex situated medially; and an estimate of its capacity is about four cubic centimetres. The calyces themselves adopt numerous variations from normal, but their terminal ends should be cup-shaped. In full inspiration the upper pole of the right kidney lies between the eleventh and twelfth ribs. It is about 2·5 centimetres (one inch) higher on the left side. The ureters descend along the lateral margins of the transverse processes of the lumbar vertebræ and follow the line of the sacro-iliac articulation, to enter the bladder below the level of the pubic symphysis.

Subsequent X ray films may reveal (*a*) failure of excretion on one side or the other, (*b*) poor excretion on one or both sides, (*c*) good excretion on each side.

Unilateral failure may be due to the following factors:

1. Temporary inhibition of secretion on one side or other may follow a recent attack of renal colic. This is a point of extreme importance, because unless this is realized a wrong deduction may be made concerning the involved kidney, and for this reason it is not advisable to carry out a urographic examination until the colic has subsided.

2. Block by a calculus or other obstruction may occur at the uretero-pelvic junction or in the upper third of the ureter.

3. Destruction of the renal tissue, as in neoplasm, in hydronephrosis or pyonephrosis, may occur, or a calculus may occupy the whole of the renal pelvis and calyces.

Bilateral failure may be due to (*a*) inhibition of urinary secretion, due to narcotics and anæsthetics; (*b*) chronic cardio-renal disease, as in patients whose condition is bordering on uræmia; (*c*) back-pressure, which is seen in bladder obstruction in such conditions as prostatic hypertrophy.

Poor excretion on each side is usually due to either back-pressure from the bladder or to cardio-renal disease.

Excretion urography reveals the presence of many pathological conditions of the urinary tract. It is not uncommon to find in chronic left-sided or right-sided pain that there may be a kidney with two complete renal pelves and calyces having their own independent ureters, which will subsequently unite to form a common ureter. This union may occur high up or quite low down, or the ureters may even continue down to enter the bladder independently; and in this condition there is frequently evidence of dilatation of the calyces of the lower pole of the renal pelvis, which appears to act as a reservoir, fails to empty completely, and thus lays itself open to infection or calculus formation.

Early evidence of infection usually tends to destroy the normal cup-shaped terminal ends of the calyces. As the infection progresses these terminal ends become club-shaped and the condition may advance to any stage if this pathological condition cannot be arrested. In those patients who have active renal infection numerous peristaltic waves are frequently seen in the ureter.

In those patients, particularly female, who have suffered from chronic right-sided pain for a number of years and who have usually undergone one or more operations (appendicectomy, colopexy and various operations on the female genital organs) without any apparent benefit, it is possible that the urographic examination will reveal the presence of varying types of renal infection or kinked and dilated ureters.

Owing to the range of movement of the kidney during respiration, one should be particularly careful before stating definitely that there is a kink at the uretero-pelvic junction or in the upper third of the ureter. This particularly applies to those patients with visceroptosis. Films taken in inspiration and expiration generally give a clue to whether the kink is pathological or merely the result of respiratory movement.

The non-opaque calculus is revealed on the urogram as a "negative" shadow, either in the renal pelvis or in the ureter. The dye surrounds this calculus and the radiograph will be less opaque in this area. If in the ureter dilatation above with spasm at the site of the calculus is found, the size of the calculus can be compared with the calibre of the ureter, and thus a good indication may be obtained as to whether the calculus will pass or remain impacted.

In the event of the dye coming down through one side only, as revealed on the early films taken, it is advisable to detain the patient and take further films even up to an hour or two hours later. A kidney that has been damaged by infection, destruction or neoplasm will probably have poor excretion powers, and if the examination is concluded too hastily valuable clinical information may be overlooked. In those cases in which the excretion rate is poor or apparently absent, it is advisable to make a retrograde pyelogram before giving any definite opinion.

Poor excretion on both sides is usually associated with cardio-renal disease, long-standing chronic infection and back-pressure, which is most commonly seen in prostatic hypertrophy with obstruction or distension overflow of the bladder. Patients suffering from early prostatic bladder obstruction are not often seen by the urologist. These patients usually put up with their symptoms for some time before seeking advice, and in the hospital class of patient renal damage may be fairly extensive before advice is sought. This manifests itself most commonly by slow excretion and moderate dilatation of both the ureters and by distortion of the renal calyces, some of which may be dilated; and even on the best radiographs it may not be possible to define the terminal ends of the calyces. The kidney itself may be enlarged, possibly from congestion, and this may cause the renal pelvis to appear very much smaller than usual.

In all patients with urinary symptoms it is advisable to make a thorough study of the bony structure of the pelvis and lumbar spine, as the presence of abnormal changes in the bony structure may reveal unsuspected secondary malignant deposits in the bone itself. It has been my experience that prostatic neoplasms metastasize first, and fairly early, in the bony structure of the pelvis and lower lumbar vertebræ.

Hydronephrosis is as a rule not difficult to detect by this method. Information of great importance can be given as regards the excretion powers of the kidneys, the amount of normal renal tissue present, and the formation of reservoirs in the renal tissue, which will subsequently become infected or collect calculi. Furthermore, it may actually reveal the cause, such as the pressure on the ureter from external conditions (adhesions, calcified glands and pelvic tumours or other abnormalities). At the urographic examination a hydronephrotic kidney usually reveals a uniformly enlarged renal pelvis with distension of the calyces, all of which are as a rule connected.

Acute renal or perinephric infections usually cause impaired secretion on the affected side, with enlargement of the renal shadow and a varying degree of obliteration of the shadow of the psoas muscle, which is usually clearly defined on a normal radiograph of the renal tract. The infection results in œdema of the perirenal and of the adjacent renal structures; and in the kidney itself this œdema will result in pressure on the glomerular excreting apparatus of the kidney, with the resultant failure of the dye to be excreted from this involved area. For instance, if the infection was situated around the lower pole of the kidney, one would expect to find little or no dye in the lower pole, while there might be quite good excretion and good definition of the calyces in the upper pole. On the other hand, multiple small subcortical abscesses may cause impaired excretion only on the affected side, and in the absence of a complete clinical examination a faulty interpretation may be given on the urogram.

Renal neoplasms give many and varied appearances. Elongation of the calyces in the particular part of the kidney, with compression of the calyces in another part, could be due to a tumour stretching some areas and compressing others. The fact that the dye intensifies the renal shadow means that a much better definition of the kidney outline will be seen on the film. The diagnosis of a primary renal neoplasm is usually one of a process of exclusion, taking into consideration the size and shape of the kidney, its function and excretory rate, and the various types of deformity of the renal pelvis and calyces. I do not think it is wise to make any other statement beyond saying that there is a neoplasm present in the kidney. The exact nature of the neoplasm must be left to the pathologist. If a kidney is neoplastic, the treatment remains the same, no matter what the type of neoplasm.

A polycystic kidney is usually a little larger than average in appearance, and the renal pelvis is of the narrow, elongated variety, while the calyces are very thin and are stretched out through the kidney substance. The calyces may be fewer in number than are usually found. This elongation of the calyces is most probably due to the pressure and distorting effect of the enlarged cysts on them. These calyces are frequently referred to as being of the spidery type. Polycystic kidneys are most frequently seen in persons under the age of thirty years. These cysts do not excrete the dye.

Excretion urograms made during pregnancy almost always show a uniform dilatation of the ureters on each side, and also a varying degree of dilatation of the renal pelvis and calyces. The condition is usually the same on each side. This dilatation is probably physiological, but at the same time one must suspect that pressure upon the ureter may be an assisting factor causing the dilatation.

As regards children, there is very little variation from the technique used with the adult. A guiding rule for the amount of material to be injected is one cubic centimetre per year of age up to fifteen years. After that the full dose can be given.

When drawing conclusions for the radiographic report on a urogram it is advisable to consider the clinical history in conjunction with the appearance revealed by the radiograph and to consider the advisability in selected cases of requesting a retrograde pyelogram, particularly in those patients in whom the function rate on one side varies from that seen on the other side.

Certain contraindications for excretion urography have been laid down; amongst these is uræmia. It appears to me to be rather futile to attempt this form of examination, as it is known at the beginning that the renal function is impaired. It has been stated that tuberculosis of the kidney is a contraindication, but it must be remembered that tuberculosis may not be suspected until the examination of the subsequent X ray films.

Pregnancy in all its stages does not appear to be a contraindication. Patients with certain other conditions, such as cardiac decompensation or failure of liver function, rarely reach the radiography department for this type of examination.

I recently encountered a remarkable occurrence. An apparently healthy man, aged thirty-six years, sought advice in the out-patient department of the hospital, complaining of pain in his back. He was instructed to report for a urographic examination. There was no evidence of any dye in either kidney three hours after the injection. Subsequent clinical examination revealed the systolic blood pressure to be 280 millimetres of mercury, and the blood urea concentration 175. This was the first indication this patient had of the serious nature of his complaint. He died three months later.

Had an ordinary clinical examination been carried out there would obviously have been no need for a urographic examination, but I think we must realize that in a busy hospital out-patient department we are at times inclined to take a short cut.

Another interesting case was that of a business man who was taken very ill in a neighbouring city. An X ray examination was carried out and gall-stones were diagnosed. He preferred to return to his own town for the operation. I did not agree with the diagnosis of gall-stones, and the urogram confirmed the presence of multiple calculi in the pelvis of the right kidney. The secretion on this side was almost negligible, while on the left side it was normal. In a subsequent operation several large calculi were removed from the pelvis of the right kidney, and a urographic examination carried out four weeks later revealed a perfect functioning on this side. For the last three years the right kidney has remained normal, but in the meantime a fairly large calculus has formed in the left kidney.

It is frequently asked whether excretion urography is superior to retrograde pyelography. The advantages of the former may be summarized as follows:

1. It is a comparatively simple procedure, which causes little or no inconvenience to the patient. It must be admitted that cystoscopic examination is an ordeal for many persons, especially if they have prostatic enlargement.

2. Photographic evidence of the renal function on each side is obtained.

3. Excretion urography is a rapid method of carrying out a complete renal examination, since by this method information is given about each side in one examination, whereas most urologists prefer to carry out a retrograde pyelographic examination on only one kidney at a time. This means delay and a certain amount of hospitalization.

4. It localizes the area for any subsequent retrograde pyelography.

5. In doubtful cases it is a rapid means of eliminating non-renal pathology.

6. It is economical in public hospital administration, since patients need not be admitted to the wards.

7. It is economical for the individuals in private practice, as very little time is lost from ordinary work.

8. The dye itself intensifies the renal shadow.

9. Excretion urography appears to be an ideal way to investigate the urinary tract during pregnancy. I have not yet seen any ill-effects from this examination.

10. It assists, but does not eliminate, retrograde pyelography.

THE EXTENDED SCHWARTZE OPERATION.[1]

By ERIC GUTTERIDGE,
Melbourne.

THE operative treatment of chronic *otitis media* is commonly divided into simple mastoidectomy—the Schwartze operation—and more or less radical mastoidectomies, in which the various compartments of the ear are attacked and the resulting cavities are drained into the external auditory meatus by removal of the posterior portion of the membranous canal. It is suggested that the most important factor is the integrity of this membranous canal, and that the Schwartze operation may be extended to drain the upper compartment of the middle ear.

The middle ear comprises an upper and lower compartment. The floor and roof respectively are formed by the ligaments of the malleus and incus and are covered by the anterior and posterior folds of Troltsch. The compartments are lined by mucous membrane and communicate by a narrow chink between the folds of Troltsch and the inner tympanic wall. The upper compartment is divided by the head of the malleus and the *ligamentum malleus superius* (which attaches the head of the malleus to the roof of the attic) into three small spaces, the posterior pouch of Troltsch, the space of Prussak (walled in front by Shrapnell's membrane), and the anterior pouch of Troltsch.

The lower compartment drains through the Eustachian tube. The upper compartment has as

[1] Read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

a means of escape of secretions, this small chink between the folds of Troltsch and the inner tympanic wall. It communicates directly with the aditus and mastoid antrum. Digestion of the thin membrane of Shrapnell, resulting in an attic perforation, with subsequent healing by fibrosis and dense, scarring, may occur.

The acute initial infection and the prolonged suppuration in the middle ear and antrum have caused pathological changes in the mucous membrane, in the submucous layer, in the ossicles and in their ligaments. The mucous membrane has lost its ciliary epithelium, the supporting columnar cells have hypertrophied or been destroyed, the submucous layer has fibrosed or developed into granulation tissue and the ossicles have suffered necrosis with destruction of their ligaments. A combination of some of these conditions makes up the pathological picture. One may speak of four stages: (i) the stage of inefficient drainage, (ii) the stage of desquamation of the mucous membrane, (iii) the stage of fibrosis and (iv) the stage of necrosis. It is in this last stage that extracranial and intracranial complications may be produced.

It is suggested that the upper compartment of the middle ear, with its extension into the aditus and mastoid antrum, is of paramount importance in the continuance and spread of the aural infection. The products of infection are prevented from escaping by the swelling and hypertrophy of the mucous layer and by the presence of granulations. The lower compartment is relatively well drained by the Eustachian tube and by the perforation of the tympanic membrane. Even if the perforation is in the postero-superior quadrant it is still a considerable distance from the upper compartment, and the pus has to seep through a constricted, tortuous channel to escape through the perforation. An attic perforation through Shrapnell's membrane is small and inadequate. It is rare to find squama or zygomatic cell extensions in chronic infections, but the presence and infection of the mucous lining of these cells may play a part in the persistence of the infection.

The mastoid antrum in chronic *otitis media* is almost invariably acellular; the outlying cells have become obliterated by necrosis of the mucous lining, by fibrosis and by osteoblastic changes, or in a large number the mastoid is of the acellular type with failure of the normal pneumatization.

It is generally agreed that the radical removal of the contents of the middle ear, as in the radical mastoid operation, should be performed only when more conservative methods hold out no hope of success. There are various methods. The simple Schwartze mastoidectomy has little success, since the mastoid antrum is part only of the infected area. Heath modified this procedure by draining the antrum through the posterior and membranous bony wall of the external meatus. Bondy proceeds further by removing the superior external wall of the attic down to the *annulus tympanicus* without interfering with the annulus or ossicles. He forms a plastic flap from the posterior membranous wall of the meatus. The Jansen-Beyer operation is similar. Jenkins removes the external wall of the attic and the *annulus tympanicus* and bridge, leaving only a small spur of the facial ridge abutting on the aditus to prevent dislocation of the short process of the incus lying in the aditus. He also makes a plastic flap with drainage into the meatus. The upper portion of the tympanic membrane falls over the ossicles. The attico-antrostomy cavity ultimately is epithelialized by ingrowths from the cut edges of the external meatus.

These modified radical mastoidectomies are suitable for patients with attic perforations or small central or postero-superior perforations. The Jenkins operation is unsuitable when much tympanic membrane has been lost, or when great destruction of the ossicles has occurred. The presence of exuberant granulations or polypi is not always a contraindication.

There are three objections to attico-antrostomy in these forms: the prolonged period of treatment required to obtain complete dermatization of the cavity, the attention required and the interference with the external canal, its ceruminous production and extrusion. The results ultimately are good as regards hearing and cessation of discharge.

It appears that attico-antrostomy could be simplified and its indications increased by omission of the plastic flap and drainage by the meatal route. A simple mastoidectomy cavity fills with blood-clot, which is penetrated by fibroblasts and ultimately forms fibrous tissue which obliterates the space. If the outer wall of the attic is removed as far as the zygomatic process and taken down to the *annulus tympanicus* which is not interfered with, the whole infected upper compartment of the middle ear and the antrum is exposed and may be cleared of infected mucosa and granulation tissue. The facial ridge is reduced, the bridge remains intact, as in the Bondy operation. If now the membranous meatal canal and its connections with the tympanic ring are left intact, a simple Schwartze mastoid cavity with a small attic extension results, and this space should become obliterated by fibrous tissue growing from the bony walls of the cavity and the intact posterior wall of the membranous meatus.

Details of the Operation of Extended Schwartze Mastoidectomy.

The area of operation is infiltrated with 30 cubic centimetres (one ounce) of 1% "Novocain" solution, containing 0·30 cubic centimetre (five minims) of 1 in 1,000 adrenaline solution. This creates a bloodless field and diminishes shock. The ordinary postaural incision is prolonged forwards to the anterior border of the auricle. A semilunar section of a depth of six millimetres is removed from the upper skin flap. This prevents the unsightly sagging of the auricle. The mastoid antrum is opened, the outer attic wall is chiselled down until the attic is opened and the wall is removed almost to the tympanic ring. The *tegmen tympani* is removed, exposing the dura. The attic is opened to the root

of the zygoma. Part of the facial ridge is removed. The membranous canal is not detached or opened. All granulations and mucosa having been removed, the cavity is closed by primary suture, or a small rubber tube may be inserted into the lowest extremity of the wound. It will be removed in three days and the wound will be allowed to heal. An acriflavine oil (1 in 1,000 in liquid paraffin) gauze strip is inserted into the external auditory meatus and replaced for a day or two. This prevents accumulation of secretions behind the membranous meatal wall and a subsequent narrowing of the canal. The patient is out of hospital in a fortnight with a healed wound.

This method is applicable to all types of perforations, small or complete. The anterior type, long regarded as an indication of upper respiratory or tonsillar infection through the Eustachian tube, is relieved and should possibly be considered as a low-grade infection of the upper compartment with slow seepage through the communication between the upper and lower compartments.

If a polypus is present in the middle ear, and if this can be removed through the meatus, the method is used. Granulations covering the labyrinthine wall indicate an extensive involvement of the bone and ossicles and would require a more radical operation. A series of patients, including one with perilabyrinthitis, has been treated. Approximately 80% had a complete cessation of the aural discharge within a month, with improvement in hearing.

As in my opinion the main source of infection has been obliterated by this operation, any residual infection should be accessible to meatal treatment and to zinc ionization, as experience demonstrates.

Summary.

A method of performing attico-antrostomy without interference with the integrity of the membranous meatal canal and with drainage through the post-aural wound has been described.

TRAUMATIC LESIONS OF THE SACRO-ILIAC AND LUMBO-SACRAL JOINTS.[1]

By C. W. B. Littlejohn,
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May I first express my thanks for your courtesy in inviting me to address this meeting on the important and difficult subject of backache. A large insurance company in America estimated that backache was responsible for 20% of the more prolonged cases of industrial disability—a sufficient testimony to its importance. As to its difficulty, there will be dispute.

In the time at my disposal it would be impossible to give more than a bird's-eye view of the whole subject. Moreover, this could be better obtained by the perusal of one of the innumerable monographs on the subject, or even by a perusal of the summary, which is less exhausting and nearly as useful. I have therefore selected a part, but an important part, of the whole: traumatic lesions of the sacro-iliac and lumbo-sacral joints.

Traumatic lesions of the sacro-iliac and lumbo-sacral joints may be divided into: (*a*) sprains or strains, (*b*) concussion, (*c*) fracture involving the joint surfaces.

The difference between a sprain and a strain is much the same as that between a break and a fracture, namely, one is much worse than the other, but no one knows which. Let us call them all sprains. A sprain is produced when a joint travels through a greater range than normal. The function of the ligaments which surround the joint is to prevent this abnormal excursion, and the ligaments being inelastic, they are damaged if the deforming force is sufficient. A sprain of the ankle is a good example, the anterior fasciculus of the fibular collateral ligament being the usual sufferer. If the ligaments or capsule actually give way, a luxation or subluxation may occur, as it does commonly in the shoulder joint.

In concussion the articular surface is bruised, the cartilage fibrillates, and the exudate organizes in the synovial recesses. Hip and shoulder joints are examples, and the sacro-iliac joint is frequently damaged in this way by a heavy fall on the buttocks, a catastrophe common among nurses and skaters.

Fractures involving the joint surfaces cause a traumatic arthritis in much the same way as concussion, the articular cartilage being rubbed away, exudate organizing in the recesses, and the periarticular structures being secondarily irritated. For the sake of brevity I intend to confine my remarks to sprains.

The ideal method of treatment in all sprains is to rest the affected joint for a short time to allow the torn vessels to seal themselves off; twenty-four to forty-eight hours are sufficient. Then the joint should be exercised, at first preferably with some support, so that the damaged ligaments will heal, as it were, on the stretch, and without the formation in their bundles of painful tangles or adhesions. The exercises should reach the pain threshold and a bit beyond, and improvement can be gauged by the recession of this pain threshold.

Rest, the ancient panacea extolled by Hilton and many others, can be overdone; it results in the production of painful tangles in the ligaments which constitute the chronic sprain. If, however, the joint is actually immobilized, as by the application of plaster of Paris, the wound in the ligament will heal in time, but with some shortening and consequent limitation of movement. If the joint then attempts to travel through its normal excursion, there will be a liability to further sprains.

The treatment of the chronic sprain is to convert it into an acute sprain by stretching or manipulation, and then to treat it in the correct manner. If the condition is comparatively recent, that is, if

[1] Read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

the actual organization of adhesions has not taken place, gradual stretching by exercises and assisted movement may be sufficient. If, however, the painful tangles are well established, manipulation under anæsthesia will be necessary.

If failure still attends these manœuvres, there remain two possible lines of treatment, namely, prolonged immobilization in plaster, and operative fixation of the joint.

Sacro-iliac Sprains.

Management of the sacro-iliac and lumbo-sacral joints conforms to the general directions laid down above.

Sacro-iliac sprain occurs more commonly in the narrow or long-backed, carnivorous, visceroptotic type, and is produced by a lifting movement of the trunk with the legs firmly braced. The joint lies practically in the sagittal plane, and the normal movement is one of rotation about an axis at the junction of its middle and lower thirds. The excursion is only three millimetres. Probably the tug of the braced hamstrings is responsible for the abnormal movement. Some cases of simultaneous sprain of both sacro-iliac joints have been reported, but commonly the right-handed man, bracing more upon the left lower limb, sprains his left sacro-iliac joint, and *vice versa*. Loading heavy boxes onto a van, shovelling heavy ground, lifting heavy weights, twisting in the saddle, even an abnormal golf swing, are methods of sprain production. Usually the victim complains that he felt something "go" in his back. If the joint is subluxated, the unevenness of the joint surfaces *plus* muscle spasm may keep it out of position, and disability is immediate and complete. More commonly the ligaments are lacerated, there is immediate severe pain, and then a dull ache. The man may, and often does, continue to work, but after a spell he finds that the pain is much worse and he is incapacitated.

The patient with subluxation is in severe pain, which is felt all over the sacro-iliac region, the buttock, the back of the thigh, and along the course of the peroneal nerve. This is a referred pain from the innervation of the sacro-iliac joint. Sneezing and coughing cause acute pain due to jarring in the sacro-iliac region. There is strong muscle spasm, and all movements are made in a very guarded fashion. Reduction is easy under anæsthesia, and is frequently possible without. In many cases reduction occurs spontaneously when spasm relaxes, as in sleep. The subsequent treatment is as for sprain.

Recent acute sprains cause similar disability, although not so severe. The treatment is rest for twenty-four to forty-eight hours, with strapping or a belt to limit movement and to support the joint, and then graduated exercise. A cure may be expected in from two to four weeks.

More commonly the patient, his friends or his medical adviser insist upon rest in bed—an ordinary bed. Within a few days, referred pains make their appearance, usually in the buttock, the thigh and the outer side of the leg. This is the so-called sciatica, which really has nothing to do with the sciatic nerve. It may be noted that the sciatic nerve does not supply the buttock. A month is a usual time for the patient to rest, by which time the acuteness of the local pain has diminished and the sciatica is well established.

Examined now, the patient stands with a lean generally away from the affected side. The lumbar concavity is lost, on account of a protective posture having been adopted. Tenderness is felt over the posterior superior iliac spine and to the outer side of it, and sometimes over the great sacro-sciatic ligament. Tenderness may also be present over the sacro-sciatic notch, in the buttock, and over the peroneal nerve as it rounds the fibula. These are referred areas of tenderness or "painful spots". Paræsthesia on the outer side of the calf is common. In long-standing cases wasting of the thigh muscles and diminution or even loss of the ankle jerk occur.

With the patient standing, flexion is limited by pain in the sacro-iliac region and perhaps in the referred areas. Frequently the patient will now curve the spine towards the affected side and flex the knee in order to relax the hamstrings. Lateral bending is limited towards the opposite side. Extension is free except in acute cases, and the same is true of rotation.

When the patient is sitting, flexion is free, owing to the relaxation of the hamstrings.

When the patient is lying, Lasègue's sign is positive at 30° on the affected side, and at 60° to 80° on the sound side, this crossed effect being due to rotation of the pelvis. With the flexed knee, forced flexion is good. In the prone position extension is painful only in severe cases. The patient turns in a very gingerly fashion, trying to prevent movement at the affected joint.

The pelvic rotation test, carried out by flexing the knee while the patient is lying prone, is positive in some cases, but I have not found it of much value. Compression or spring of the iliac crest is of little value, and rectal examination reveals no abnormality.

X ray examination serves only to eliminate other causes for the disability. Even in subluxation cases the amount of slip is very small, and the direction of the displacement is such that it is impossible to demonstrate it.

Treatment.

In recent and comparatively recent cases—up to about one month's duration—exercises and assisted movements *plus* manipulation without anæsthesia may be successful. Useful exercises are touching the toes with the knees straight, bending and touching the left toe with the right hand and *vice versa*, bending and touching the left toe and then the right toe with both hands, "the hula and the lily", and sitting with the knees straight and touching the toes. Suitable assisted movements and manipulation are straight leg raising, Bankart's manœuvre, Barker's manœuvre, extension, and sitting flexion.

If manipulation under an anæsthetic is necessary, that is, if improvement does not occur or is arrested, the various manœuvres are those already detailed, but they are carried out with considerable force. It has been estimated that it is not possible to injure the spine by the display of ordinary full force in these manipulations. The subsequent treatment in a case in which manipulation has been done is the same as in a recent one.

After-Treatment.—The patient should do the exercises many times a day, and should walk as much as possible. As soon as possible all support must be discarded, and to avoid abuse of support I generally omit it altogether.

A bed without sag is necessary, and the easiest way to ensure this is to put the mattress, or two mattresses, on the floor. A more refined method is to prescribe a spiral spring mattress.

Physiotherapy in the form of heat of some sort—indeed, of any sort—is a great help as a preliminary to the doing of exercises. The simpler the source of heat, the better. There is a great danger of giving the patient a "blue-spark complex". Heat by itself is as useless as massage.

Improvement may be measured by an increasing range of painless movement, that is, by a recession of the pain threshold. If improvement ceases, or if there is a relapse, it is necessary to go more gently for a day or two.

Finally, if these measures fail, it is my practice to fix the affected joint by some form of bone key, following the technique devised by Smith-Petersen, of Boston. The gluteal muscles may be either turned down or split in the direction of their fibres; the joint is exposed by the removal of a window in the ilium, and as far as possible it is erased. The window is now cleaned of cartilage and driven into the sacrum. The edges of the aperture are crushed down to fill up any gaps, the muscles are replaced and the skin is sutured. The patient remains six weeks in bed. Pain is abolished from the time of operation, and the results, provided the diagnosis is correct, are excellent.

Lumbo-Sacral Sprain.

Lumbo-sacral sprain is more common in the broad-backed, herbivorous, splanchnoptotic type. It is produced by hyperextension at the lumbo-sacral joint, as when the lower limbs overbalance in diving, when the feet slip in lifting, in going for a lob in tennis, when a heavy weight slips back whilst being pushed *et cetera*.

The pain is duller than in acute sacro-iliac lesions, but spasm may be very severe, and may "cast" the patient in any position. Coughing and sneezing are acutely painful, and turning in bed is agonizing; it is done in a very gingerly fashion.

Again, if rest is limited to twenty-four to forty-eight hours and active movements are commenced early, the patient's condition rapidly improves. When rest is prolonged, the pain becomes constant and disabling. Referred pain is round the outer side of the hip and towards the front of the thigh. Occasionally difficulty is caused by pre-fixation or post-fixation of the nerve plexus. Sciatica, however, is not common in lumbo-sacral lesions. Both sides may be implicated at one time, but commonly one side is affected. It must be clearly understood that the lesion is in the joints between the zygapophyses, and not in the region of the intervertebral disk.

Occasionally the soft tissues may be bruised between the spinous processes, which gives rise to central pain and tenderness as described by Bankart. In my experience this is very uncommon.

On inspection of the patient, a very pronounced deviation may be found, either towards or away from the affected side. Sometimes the deviation may alternate. Wasting is not seen, but spasm is often marked. Tenderness is greatest just above and to the medial side of the posterior superior spine.

With the patient standing, flexion is limited, but not to the same degree as in sacro-iliac sprain; the lumbar spine is held rigid, and flexion is carried out mainly at the hip joints. The deviation tends to disappear on flexion, and on resumption of the erect position it reappears often with a sort of screwing movement, as if some rough spot in an articulation was being passed over. Occasionally the deviation reverses when the patient is coming upright. Lateral bending is more painful towards the lesion, as the joint is compressed. Extension is very painful. Rotation is limited only in its extreme range.

With the patient sitting, flexion is not free as in sacro-iliac sprain, since the relaxation of the hamstrings does not affect the lumbo-sacral joint, and the lumbar spine is still held rigid.

When the patient is lying, Lasègue's sign is positive only at high angles, when the lumbar spine comes into play. With the flexed knee, full flexion at the hip is painful for the same reason. Extension is very painful, sometimes more so with extension of the limb on the unaffected side. The pelvic rotation test may help to localize the lesion. Rectal examination reveals no abnormality, and X ray examination is necessary only to eliminate other possible causes of the pain and disability.

Treatment.

Substantially, treatment is similar to the treatment of the sacro-iliac lesion. In carrying out manipulation, both with and without anæsthesia, it is important to carry out full flexion and full extension of the lumbar spine, also forced rotation and lateral bending.

If operation is necessary and the affected joint can be strictly localized, my best results have been obtained by exposing the joint, excising it, and wedging in a piece of cancellous bone from the tibia or from the ilium. Unfortunately, it frequently appears that more than one joint are affected, and it may be necessary to use a combination of techniques to fix the lower two or three lumbar vertebræ to the sacrum. A mixture of Hibbs's and Albée's methods, with additional excision and wedging of the zygapophyseal joints, has been tried. In some

cases osteoperiosteal grafts have replaced the classical tibia graft, and portions of the iliac crest have also been used. It seems possible that an anterior method might be successful, a method such as we are using for spondylolisthesis. On the whole, the results are satisfactory, but not so spectacular as in sacro-iliac lesions.

Lesions of the sacro-iliac and lumbo-sacral joints may be very closely simulated by posterior herniation of the *nucleus pulposus*. To exclude this condition X ray examination after intrathecal injection of lipiodol is necessary.

THE TREATMENT OF TRIGEMINAL NEURALGIA.[1]

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IN presenting this paper I feel that some explanation is necessary for an addition to the already voluminous literature on the subject. I cannot pretend that it is the outcome of a vast experience in dealing with these cases, and I believe that few, if any, in this country, could speak with such authority. Who is there here to speak with the authority of Frazier, Cushing, Horrax, Dandy, Harris or Stookey, to mention a mere few who number their cases in hundreds? Most of us, I fear, must derive our personal experience from a few dozen cases, occurring at rather infrequent intervals.

However, I believe that this very lack of numbers may have the advantage that one speaks without that prejudice which must almost inevitably be born of long personal experience and the highly specialized technique developed by the advocates for the various types of treatment.

It has been my endeavour for a number of years to attempt an estimation of the curative value of each suggested method of treatment, not in the hands of a master of each, but in the hands of a surgeon to whose lot it occasionally falls to attempt the alleviation of this very distressing malady. I have therefore developed a routine procedure which has proved reasonably satisfactory to me in my limited experience, and I offer it for your criticism.

In the limited time available a discussion of the diagnosis of trigeminal neuralgia is impossible, but let me here emphasize the necessity of establishing an accurate diagnosis before any treatment is attempted. The various forms of treatment adopted for established trigeminal neuralgia will not, in most instances, relieve the conditions which simulate it.

A patient presenting himself or herself to a surgeon for the first time is an object of pity, not only for the distress occasioned by the disease, but also from the psychological point of view. It is rare in my experience to see a patient who has not been subjected to various forms of treatment over a considerable period, and I find almost invariably that each patient has lost heart after successive failures to obtain relief, and is a pitiable object, doubtful of the value of any advice, and reduced to a state of both physical and financial exhaustion. The first task, then, in such circumstances, is to endeavour to instil fresh hope into the mind of the patient and to find out by careful interrogation what has previously been tried, and to make up one's mind as to the reasons for failure.

In my opinion, the oft-repeated statement of some authorities that, the various forms of treatment having been explained, the ultimate choice should be left to the patient, is wrong. The patient suffering from such a distressing condition is the worst possible judge of what should be done, and will almost invariably shrink from suggested major procedures. It is my practice therefore to explain to the patient the routine measures I adopt and to emphasize the fact that unless these suggestions are accepted in the order I think fit, the patient had better seek aid elsewhere.

A satisfactory understanding with the patient having been reached, a search is instituted for all possible sources of mechanical irritation of the trigeminal nerve and for toxic foci, both local and general. It is explained to the patient that the removal of such possible originating causes is not likely to result in cure in well-established cases.

Apart from the routine radiological examination of teeth, sinuses *et cetera*, it is my custom during this preliminary period to have two special radiological investigations made. These are: Firstly, a radiograph taken in the "axial position" used for the demonstration of the sphenoidal sinus. This enables me to obtain a reasonably accurate idea of the size, shape and position of the *foramen ovale*, the necessity for which will be explained later. Secondly, an oblique stereoscopic radiograph is obtained, to show the middle cranial fossa on the affected side (Figures I and II). I have found that this gives very valuable information as to the general contours of this region, and the surgeon is able to anticipate the various operative difficulties which may have to be overcome during the temporal approach to the posterior root of the Gasserian ganglion.

The various forms of treatment may be divided into palliative forms and attempts at cure. I explain to each patient that the palliative forms of treatment will be used only in order to fit them for the ultimate attempt at cure. One exception must be made here, in that the palliative forms of treatment must suffice in the extremely elderly patient in poor condition.

Palliative Forms of Treatment.

Medical Treatment.

Many scores of drugs have been tried for palliative treatment, but few are efficacious. I do, however, believe that a combination of butyl-chloral hydrate and gelsemium has in some cases a beneficial effect, in that it helps to keep all but the most severe paroxysms under sufficient control to enable

[1] Read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

the patient to obtain the necessary rest and nourishment to fit him or her for further procedures. Aspirin may help in the milder cases, and I have more recently obtained beneficial results from the

Figure I.
Showing photograph of "smooth" middle cranial fossa.

newer preparation "Veganin". For those patients with very severe paroxysms I find that the inhalation of trichlorethylene has a definite value. Twenty to thirty drops sprinkled on a handkerchief are inhaled three times daily until no further odour can be detected. Appropriate precautions must be taken to prevent the patient becoming unconscious during the inhalation. I believe that the potency of this drug must vary. On two occasions I have noted complete absence of relief after the inhalation of trichlorethylene, yet a further supply of the drug from a different source has proved effective.

Figure II.
Showing "rough" middle cranial fossa.

It has not been my good fortune to observe long-lasting benefit from this treatment, yet many instances of permanent benefit are reported by observers with great experience.[1] As a means of temporary relief, however, I believe that it is extremely valuable in many instances.

Radiotherapy.

It is not my custom to advise radiotherapy in any form for the treatment of this disease. This attitude may be wrong, but it has arisen as a consequence of unsatisfactory results in cases which have come under my care after such treatment had been adopted, and also because the results claimed for this form of treatment do not approximate those obtained by more established methods.[2] I should welcome criticism of this attitude, as I feel that radio-therapeutists have perhaps not been given a fair opportunity to show what can be done for this disease by deep X ray therapy. They must, I think, like many neurosurgeons, have been looked upon as a last resort after all sorts of "tinkering" treatment had been tried.

Also included in the palliative forms of treatment are all procedures directed against the various divisions of the trigeminal nerve distal to the Gasserian ganglion. Actual division or avulsion of any of these branches should have no place in the modern treatment of established cases of trigeminal neuralgia.

There remains, then, the treatment by injection of alcohol either into the main trunks, close to their origin, or into the more distal points at which these approach the skin surface through the various foramina. In my opinion the distal injections are very rarely indicated and can give no promise of satisfactory relief.

Proximal Injections.

Under the heading "Proximal Injections" I place injections of the main divisions of the trigeminal nerve as closely as possible to their origin in the Gasserian ganglion. This type of injection is placed in the palliative class because, partly on theoretical grounds and partly as the result of accepted experience, it is unlikely to result in permanent cure. Theoretically, the neurolysis of a nerve cannot be expected to produce permanent results, as regeneration must take place in greater or less degree in every case.

My own plan of action regarding injection of the nerve trunks follows very closely that of Horrax and Poppen,[1] who advise giving at least one trunk injection before proceeding to division of the posterior root. I advise this because a certain number of patients will obtain sufficient relief to postpone more drastic procedures for a period at all events, and in any case it is advisable, in that it enables the patient to appreciate to some extent the permanent loss of sensation he will experience if more drastic procedures become necessary. As well as this, the injection has a certain diagnostic value, as it is known that neurolysis of nerve roots will not relieve the atypical facial pains which simulate *tic douloureux*.

My practice differs from that of Horrax in that I do not feel certain of my ability to inject adequately the second division trunk with anything like the certainty I feel about the third division. I therefore use this trunk injection as part of the

routine treatment only in dealing with cases in which pain originates in the third division, and in which any second division involvement can be regarded as an overflow.

The route for injection is a matter of personal choice, and may be either the lateral approach, as preferred by most American writers, or the modified Härtel approach, to be described later. The maximum period of relief which can follow a well-placed injection of the third division trunk is twelve to fifteen months.

Even if a fair hit of the nerve trunk has not been made by the injection, it is of considerable benefit in providing sufficient relief from pain for the improvement in general health which is necessary before operative treatment is resorted to.

Curative Procedures.

Injection of the Gasserian Ganglion with Alcohol.

Probably no suggested method of treatment for trigeminal neuralgia has met with such trenchant criticism as has injection of the Gasserian ganglion with alcohol.

I believe that the main objections to this method have arisen as a result of lack of experience on the part of would-be exponents of the method, of lack of knowledge of the anatomy of the ganglion and of the foramina in the base of the skull, and more particularly as a result of the publication of unfortunate experiences when the route of injection has been ill chosen.

To deal with the latter reason first, I would point out that in 1923 an unfortunate sequel to a ganglion injection was published in *The British Journal of Surgery*.[4] It was frankly stated that after the needle had been made to enter the ganglion, cerebro-spinal fluid dripped from its proximal end. In spite of this, the needle was withdrawn a short distance until no more fluid escaped, and alcohol was injected. A widespread paralysis of cranial nerves resulted.

The disastrous results of such a foolish blunder should not be held as an objection to this method, and it cannot be too strongly urged that if such a flow of cerebro-spinal fluid should be obtained during the introduction of the needle, alcohol should never be injected and the attempt should be abandoned for the time being.

If cerebro-spinal fluid escapes from the needle, it can only do so as a result of introduction of the needle point too far in the long axis of the ganglion, or as a result of puncture of the dural envelope of the ganglion and of entry of the needle into the basal subarachnoid space.

I believe there are certain objections to the accepted route of Härtel, in that, owing to the plane in which the needle is introduced, it is possible after entering the foramen to pierce the dural envelope of the ganglion. As well as this, the needle does not lie in the long axis of the ganglion, and consequently an adequate distribution of alcohol cannot be obtained. The same holds good to a greater extent when the lateral route is used, and I do not believe that adequate injection of the ganglion could ever be obtained by this method. The method I am about to describe has none of these disadvantages, and with a moderate amount of practice on the cadaver any operator can inject the ganglion adequately and, I believe, safely in most cases.

This statement needs qualification, in that the shape and direction of the *foramen ovale* are occasionally abnormal, and instead of pointing forwards and slightly outwards, the foramen is directed forwards and inwards. It is possible, however, to obtain a good knowledge of the size, shape and direction of the foramen by having the skull radiologically examined in the so-called axial position, which is used by radiologists for examination of the sphenoidal sinus. If in such a radiogram the *foramen ovale* is clearly visible and oval in shape, it should be possible to inject the Gasserian ganglion by the route described below.

The skin of the cheek is anæsthetized with "Novocain" immediately below the tubercle on the lower margin of the malar process of the maxilla (Figure III). This skin is then pulled slightly upwards and a suitable needle is introduced immediately beneath the bony process.

Figure III.
Showing position of needle beneath tubercle on malar process of maxilla.

This needle should be of sufficiently stout gauge to prevent easy flexibility, and must have a long bevel. A marker is fixed to the needle at a distance of six centimetres from its tip.

The bevel of the needle is directed upwards and inwards, and the needle is pushed upwards and backwards at an angle of 30° to Reid's base line (Figure IV) and inwards at an angle of 30° to the sagittal plane (Figure V). Whether the skull is of brachycephalic or dolicocephalic type, these angles are nearly constant. The point of the needle impinges on the base of the pterygoid process of the sphenoid bone, and the bevelled surface causes the point to slip backwards towards the *foramen ovale*. At this stage the patient almost always complains of shooting pains in the distribution of the third division, and a few minims of "Novocain"

solution are injected. If the needle is pushed a little further its point will impinge on the posterior margin of the *foramen ovale*.

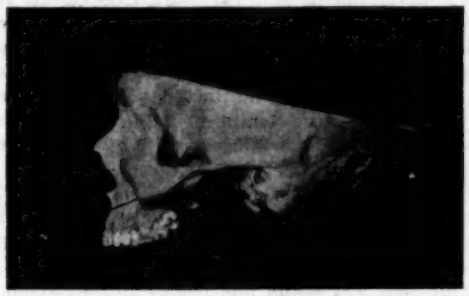

Figure IV.
Showing lateral view of position of needle.

It is important to note that if a straight needle is in contact superficially with the malar process of the maxilla, it is impossible for the point to enter the *foramen ovale*. This statement is made as the result of observation of a large number of dried skulls, and is a point of the utmost importance, in that it affords a means of knowing definitely when the needle point is at the entrance to the foramen.

Figure V.
Showing relation of needle to base of skull.

The needle is now withdrawn very slightly, and its proximal end is depressed about one centimetre. It is then advanced one centimetre, and the point of the needle lies well within the ganglion and parallel to the long axis of the ganglion (Figure VI). The latter point is of great importance, in that there is no danger of piercing the dural envelope and the needle point is in a position enabling a good distribution of alcohol to be made.

An 80% solution of alcohol containing 1% "Novocain" is now slowly injected, the quantity being 0·25 cubic centimetre. The bevel of the needle being directed upwards and inwards, most of this alcohol will be distributed through the medial portion of the ganglion. The needle is then rotated through 180 degrees and a further 0·25 cubic centimetre of alcohol is injected. Experiments with the injection of coloured alcohol into the Gasserian ganglion of cadavers led me to believe that this method of using a needle with a long bevel and making two separate injections, with the bevel in opposite directions, gave a better distribution of alcohol within the ganglion than any other method. It was found impossible to get an adequate distribution of alcohol through a needle with a short bevel without using an excessive amount of alcohol.

Within a few minutes anæsthesia of the whole trigeminal area is complete and the needle is withdrawn.

Figure VI.
Showing needle in final position lying in long axis of ganglion. Lateral portion of skull is cut away into *foramen ovale*.

It is my custom to suture the eyelids on the affected side, after carefully cutting the eyelashes very short. The eye is kept closed for one week, at the end of which motor goggles are provided, and the patient is instructed to wear these constantly for three months. At the end of this time there is very little likelihood of corneal ulceration.

The above method has given me satisfactory results. Of a total of 21 injections attempted, 11 have been completely satisfactory, and these patients have been cured of their neuralgia for periods varying up to seven years. Injection failed completely in four cases, and subsequent operation disclosed that the *foramen ovale* was abnormal in type. The ganglion was injected without permanent relief from pain in six cases.

It is claimed for this method that it is safe and comparatively simple, requiring only a reasonable amount of practice on the cadaver. In my opinion, if 50% of patients can be cured by this single injection of alcohol into the ganglion,

then the injection method has an established place in the treatment of trigeminal neuralgia.

If a single injection of the Gasserian ganglion fails to produce relief, it is not my practice to persist with this method. Every injection produces an inflammatory reaction within the dural sheath of the ganglion, and in many instances there is apparently some seepage of alcohol as far back as the dural tunnel which houses the terminal portion of the posterior root. I can only attribute the failure of two posterior root divisions in my series to the fact that I may have left behind portions of the root which had become adherent to dura as a result of multiple injections into the ganglion made elsewhere.

Apart from the possibility of corneal ulceration, the method of guarding against which has been previously mentioned, the only complication of injection which I have encountered is transient facial paralysis, which in two cases appeared on the third day and had completely vanished at the end of three weeks. An interesting phenomenon was noted in one case. During the injection of alcohol into the ganglion there was a sudden and extreme dilatation of the pupil on the same side. I can attribute this only to a possible seepage of alcohol through the *foramen lacerum* onto the carotid sympathetic plexus. Within twenty-four hours the pupil was again normal and no further trouble ensued.

Division of the Posterior Root of the Gasserian Ganglion.

If ganglion injection has failed to produce relief of pain, or if a patient presents himself after having had injection attempted elsewhere, I proceed to division of the posterior root of the Gasserian ganglion.

I believe that the occasional operator in this region should take extreme pains in the preparation of the patient, in the estimation of possible difficulties, and in the choice of anæsthesia.

I endeavour to get my patients into the best possible condition, both physical and psychological, by the means already described before planning the operative treatment.

In all cases in which the approach is to be by the temporal route, the oblique stereoscopic radiograph of the temporal fossa, previously described, is studied carefully, and this has proved a definite aid in estimating the operative difficulties. In the small series of patients on whom I have operated, several types of anæsthetic have been tried. I am now an enthusiastic advocate of a sub-basal dose of "Avertin" combined with "Cyclopropane". I am more than fortunate in the surpassing excellence of my usual anæsthetist, and the above combination in his hands has been most satisfactory even in the most trying circumstances.

The operative technique of this approach is so well known that it needs no description here. I confess that I do not attempt the differential section of the posterior root to the extent practised by Stookey.[5] Indeed I am always at a loss to understand how he does accurately differentiate the various divisions in a nerve root, hooked up from its normal position, and consequently somewhat distorted. My practice is to leave some of the more medial fibres in all cases in which the first division is not involved. The motor root is preserved if easily seen, but no attempt is made to preserve it if in my opinion the success of the operation is likely to be endangered by so doing.

I have never practised the operation devised and recommended by Maxwell, of Sydney,[6] in which the trigeminal trunk is divided in the posterior fossa, through a temporal approach, after the superior petrosal sinus has been elevated from the crest of the petrous portion of the temporal bone. The method does not appeal to me, chiefly because of the potential danger of damage to the petrosal vein, which is described by Dandy[7] as lying in a number of cases in close approximation to the trigeminal trunk. I have observed this vessel in such a position in the cadaver, and it would seem to be liable to damage by Maxwell's route.

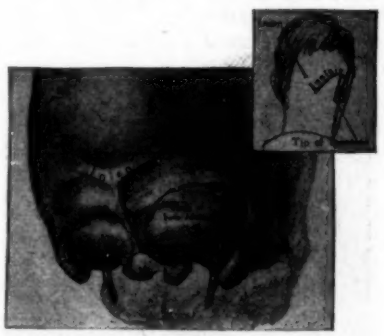

Figure VII.
Showing incision and bone removed in exposing trigeminal trunk in posterior fossa. (Dandy.)

I have not had the misfortune to observe any facial paralysis in any patients treated by posterior root section by the temporal approach. When the whole root has been sectioned the after-treatment to the eye has been identical with that practised after ganglion injection.

I have never practised the operation of Dandy[7] (Figure VII) through the posterior fossa on the living subject, although I have several times examined the possibilities of this method in the *post mortem* room. To me Dandy's claims for this method are very convincing in certain circumstances. As I have already stated, there is a predisposition to unsatisfactory results in patients who have been subjected to many ganglion injections. In such cases the difficulty of adhesion of the posterior root close to the ganglion would be overcome by division of the root close to the pons. Again, the unfortunate "second-hand" patient who has previously undergone an unsuccessful operation by the

temporal route will surely be more satisfactorily dealt with through virgin country in the posterior fossa.

A still further advantage claimed for this method is the occasional occurrence of tumours in the posterior fossa, which, by their situation in relation to the trigeminal trunk, are the actual cause of the neuralgia.

Summary.

1. The outlook of the neurosurgeon who is only occasionally called upon to treat trigeminal neuralgia is discussed.

2. A distinction is made between palliative treatment and attempts at cure.

3. An attempt has been made to justify the inclusion of injection of the Gasserian ganglion with alcohol in the plan of treatment, and a satisfactory method of injection is described.

4. The necessity for careful planning of surgical procedures by the occasional operator is stressed.

5. Some of the advantages of division of the trigeminal trunk in the posterior fossa are mentioned.

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SCIZOPHRENIC PATIENTS TREATED BY INDUCED CONVULSIONS.

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Reference has already been made in this journal to "Cardiazol" convulsion therapy,(1) the method recently introduced by von Meduna in Budapest; and the purpose of this communication is to report the results of what we believe to be the first cases treated by this method in Australia. Our observations have been made upon sixteen patients sent into hospital suffering from schizophrenia. No attempt at selection was made, some patients having been relatively recently admitted and others being of long standing. Four patients were males and twelve females. The first patient commenced treatment on July 27, 1937.

Of the first five patients to receive a complete course of treatment, three have been discharged from hospital apparently cured. In the next group of five, another three patients have achieved a complete remission. Of the whole series of sixteen patients, four are still undergoing treatment. Two patients in the group have shown no improvement; both were females, seventeen years of age, whose mental illness was of the type designated by Kraepelin as *läppische Verblödung*. Improvement, while not amounting to a complete remission, was observed in four patients, in three of whom the psychosis was of somewhat long standing.

In Table I are shown the results obtained and the details of treatment in a series of nine cases.

The method of treatment followed that laid down by von Meduna(2) and practised by him at the Royal Mental Hospital at Budapest, except that we very soon found it advantageous to treat each patient separately in a single room instead of behind screens in the same ward. Some of the patients became apprehensive before treatment and pleaded to have it discontinued; but others remained more or less indifferent, and with the onset of mental improvement would cooperate, although admitting that they disliked the treatment.

In over two hundred artificially induced convulsive seizures no untoward results have been seen; and in no case did the patient's mental condition deteriorate as a result of treatment. Some patients were emaciated and in poor physical health, yet were able to proceed with the treatment. There was a general tendency among the patients to lose weight during the treatment; this may have been due to their having to go without breakfast on the treatment days, and a tendency to refuse food or to vomit, which was sometimes observed on the day of the convulsions. Weight was rapidly gained when the treatment was terminated, one emaciated female gaining 15·8 kilograms (35 pounds) in the twenty-eight days following a complete remission of her mental symptoms.

Treatment is never given to a patient suffering from an acute physical illness; but one of us has successfully treated a female patient with chronic bronchiectasis. Patients should, before undergoing treatment, be given a thorough physical examination, particular attention being paid to the cardiovascular system and to the kidneys. Sedatives should be withheld for at least twelve hours before convulsions are induced. No food should be taken on the morning of treatment. The bowels and bladder should be emptied before treatment. It is essential that all artificial dentures should be removed before the injection is given. The after-effects are in no way severe. Slight headache and tiredness may be the only complaints. Anorexia and vomiting have been noted, but are rare. On the day following treatment the temperature of

TABLE I.

Results of Treatment of Schizophrenia by von Meduna's Method.

Patient.	Age.	Sex.	Diagnosis.	Duration of Illness.	Dose of Cardiazol.	Number of Injections.	Number of Fits.	Time of Induction (Average).	Time of Fit (Average).	Post-Convulsive State.	Course.	Result.
L.M.	25	F.	Catatonia.	2 to 3 months.	C.cs. 5·0	31	25	Seconds. 16	Seconds. 55	Few spasms.	Gradual improvement.	Complete remission.
E.P.	25	F.	Hebephrenia.	2 years.	6·5	20	16	13	49	Spasms and excitement.	Spasmodic improvement.	Improvement; not stable.
M.P.	29	M.	Hebephrenia.	2 years.	5·5	8	4	—	—	Few spasms.	—	Objected to treatment after some improvement.
W.B.	36	F.	Catatonia.	4 months.	6·0	16	10	13	15	Quiet and sleepy.	Steady improvement.	Complete remission.
C.B.	23	M.	Hebephrenia.	3 years.	7·0	23	19	18	46	Severe twitchings.	Some improvement.	Still under treatment.
C.M.	20	F.	Catatonia.	?	7·5	29	14	21	56	Few twitchings.	Slowly improving.	Still under treatment.
D.G.	23	F.	Hebephrenia.	6 weeks.	7·5	18	10	14	48	Great excitement and twitching.	Steady improvement.	Complete remission.
S.G.	25	M.	Hebephrenia.	2 to 3 years.	7·0	14	9	10	57	Severe twitchings.	Some improvement.	Still under treatment.
L.T.	34	F.	Catatonia.	6 years with remissions.	6·0	7	4	14	52	Quiet.	Improving.	Still under treatment.

some patients became slightly elevated. This never persisted for more than a day, and no explanation was found for it.

Though the fit-producing dose of "Cardiazol" varied from patient to patient and occasionally from one day to the next, it was never found impossible to induce a seizure by the requisite dose. Though von Meduna suggests commencing with a dose of 5·0 cubic centimetres of a 10% solution of "Cardiazol" and increasing it by 1·0 cubic centimetre until the fit is produced, we found it expedient to commence with a smaller dose, as in some cases convulsions would occur as the result of an injection of 3·0 cubic centimetres. There seemed to us to be no definite relation between the amount of "Cardiazol" necessary to produce the fit and the physical or mental state of the patient. The largest dose we found necessary to use was 8·0 cubic centimetres. Once the fit-producing dose has been found for a particular patient it will generally suffice to produce convulsions; but when at the commencement of treatment the fit-producing dose is low it may as time goes on fail to produce convulsions and have to be increased accordingly. On some occasions the correct dose, properly administered, fails to produce any response in the patient. This may be due to the action of a sedative administered during the previous night; and we found that if it were necessary to give a sedative to control restlessness or insomnia during the night prior to treatment, an injection of hyoscine and morphine was less likely to prevent the subsequent convulsions than bromide and chloral or a barbital derivative. Even when no sedative had been administered previously we found occasions when the patient was unresponsive to the treatment. No explanation for this behaviour has so far presented itself.

Von Meduna maintained that in order to produce convulsions it was necessary to inject the "Cardiazol" at the rate of at least 1·0 cubic centimetre per second. To do this successfully requires a needle of fairly large bore and an adequate vein. We encountered difficulties with female patients whose veins were small and invisible; for, although the injection given inadvertently into the tissues does not cause sloughing, it does not produce convulsions and may tend to cause mental upset for some time following. We found that a modification of von Meduna's technique overcame this difficulty. The tourniquet is left on the arm until the whole injection, which may be given quite slowly and with

the smallest hypodermic needle, has been delivered. Releasing the tourniquet after such an injection has the desired effect of liberating the whole dose of "Cardiazol" into the circulation at the same moment, and the desired convulsion soon follows. When the veins are particularly small the quantity of the injection may be halved by using a 20% solution of "Cardiazol".

The great majority of fits produced by "Cardiazol" were of the typical major type; but attacks of *petit mal*, with amnesia, twilight states and psychic equivalents, have been observed by us. At the onset of the fit the patient's mouth opens widely and then clamps down convulsively upon a gag or tampon placed therein to prevent injury to the tongue and lips. Sometimes, however, the mouth remains open in a state of spasm during the whole fit. The aura experienced by most patients is olfactory; the majority of them commence to cough or splutter as soon as the injection is given. One patient, who talks during the induction period, says the "fumes" get gradually more suffocating and overpowering, as if he is going under an anæsthetic, until he finally loses consciousness. Another patient said his injection "smelt like lightning". Occasionally the fit is ushered in with a typical "cry". Psychomotor restlessness and clumsy "flight movements" appear to be the prevailing premonitory signs of the fit. Post-convulsive twitching is not uncommon, and jerking and isolated convulsive spasms have also been observed. Although the average induction time in our cases was about fifteen seconds, we have seen cases in which the fit commenced almost as soon as the injection was given, and one of us observed a case in which the convulsions did not commence until four minutes after the injection was completed.

The convulsions last from about forty-five to sixty seconds. They are usually followed by deep stertorous breathing, although in some cases there may be a somewhat long and, at first, rather alarming period of apnœa. In these cases a few seconds' artificial respiration will suffice to restore normal breathing. We sometimes use an oxygen tent, but whether this is of more value in restoring confidence in the operator or respiration in the patient has not been definitely determined.

There appears to be but one rule governing the number of fits necessary to produce a remission, and that is that the treatment shall go on for a short time after the fullest beneficial results have been obtained. It has been suggested that when improvement is slow in appearing, treatment should not be abandoned until at least twenty fits have been provoked. Some patients commence to improve after the first few fits; some seem to run a remitting course, and others again do not show a beneficial response until treatment has progressed for several weeks. Twice, when patients improved after a few treatments, we, in error of judgement, terminated the injections, only to see the patient relapse, and when injections were continued the patients finally achieved apparently permanent remissions. It would therefore seem essential to prolong the treatment beyond the stage of maximum benefit. Our results substantiate the claims of von Meduna that catatonic patients show the best response to treatment, though patients with other types of schizophrenia are decidedly benefited in the early stages of the illness.

We feel confident that in the method of induced convulsions we have a valuable aid in the treatment of schizophrenic cases. We doubt whether "Cardiazol" has any specific action in such cases, and we think it foolish to assume that induced convulsions will cure schizophrenia. But we have a definite and unequivocal belief that by a properly controlled course of convulsions patients may be brought in touch with reality, that the structure of the autism may be broken through and that the patient may, under the guidance of the psychiatrist, be led back to normal thinking and helped to make acceptable adjustments to the environment.

Though an induced convulsive seizure is an alarming spectacle and the patient is not

> Like one who wraps the drapery of his couch
> About him, and lies down to pleasant dreams,

the procedure would seem to be no more dangerous than the giving of an anæsthetic. The technique is simple and the patient's premonitory apprehension is soon shrouded in amnesia. We believe the chief danger lies in this very simplicity, in that it may be undertaken lightly and used on mental patients indiscriminately by those lacking in psychiatric judgement and experience, and in whom "wisdom is consum'd in confidence". And we feel it not out of place to warn those not engaged specially in the practice of psychiatry both of the possible dangers and of the limitations of this form of treatment. Results should not be sought with this method outside the early schizophrenic patients. They will be disappointing even in this group unless the psychiatrist takes a guiding hand in the patient's mental rehabilitation also.

The best remission will be obtained in the case in which, before the onset of the psychosis, the patient possessed a well-integrated personality and a firm hold upon reality. Beyond this the limitations of our experience prevent any dogmatic assertions. The permanence of our results are still in question. As with any form of mental healing, enthusiasm must rank among the possessions of the therapist; lest it gain ascendancy over judgement, we believe it were well to turn the key of scepticism in wisdom's gate until such time as the results which have been achieved through convulsion therapy have been established as permanent.

References.

(1) R. S. Ellery: "Schizophrenia and its Treatment by Insulin and 'Cardiazol'", The Medical Journal of Australia, October 2, 1937, page 552.
(2) L. von Meduna: *"Konvulsionstherapie der Schizophrenie"*.

Reports of Cases.

PINK DISEASE OCCURRING IN AN ADULT.

By K. McK. Doig, M.B., B.S.,
Colac, Victoria.

Acrodynia is better known to us in Australia as "pink disease", under which name it was described by Swift in Adelaide in 1914. Since that time numerous cases have been reported in this country and elsewhere, and most of us are more or less familiar with the features of this distressing malady. So constantly, however, do we find this disease occurring in infancy that it comes somewhat as a surprise to discover it in the adult, and the age of the patient in the case recorded below is a justification for the publication of this report.

Some text-books of medicine lead one to assume that the disease is entirely confined to infancy. Meakins (1936) says that 99% of the patients are under the age of six years; Rocaz (1933) quotes a case in a child aged fourteen years, and goes on further to state that pink disease is quite exceptional at this age.

American observers have occasionally reported acrodynia occurring in adults. Two cases were reported (C. J. White, 1926), and attention was drawn to the fact that the disease might sometimes be overlooked. A good summary of the main features of acrodynia was given, H. R. Foerster and F. C. Rodda being quoted, who said that these features could be classified under the following heads: (i) general or gastro-intestinal symptoms, such as anorexia, lassitude, weakness, loss of weight, constipation, loss of teeth; (ii) neurotrophic symptoms, such as hyperirritability, paræsthesia, loss of reflexes, photophobia, pain; (iii) cutaneous features, such as (*a*) diffuse erythematous rash over the trunk and (*b*) local rash affecting the feet and hands, with swelling, cyanosis and desquamation.

Rocaz (1933) quotes Bilderback, who puts the main features more succinctly and in mnemonic form as follows: pain, pink, peeling, prostration, paræsthesia, perspiration.

Case History.

The patient was an Italian immigrant, aged thirty-three years, and his illness commenced three to four months prior to his admission to hospital, when he developed a gingivitis following the use of mercurial ointment in the treatment of *pediculosis pubis*. Soon after this he began to perspire profusely and persistently, and the sweating had no relation to the taking of drugs of any sort. Pain then appeared in the feet and hands and was described as a burning sensation, worse at night. This was so severe that it resisted simple sedatives and kept him awake. About the same time he also became aware of pains in the legs and back, especially the lumbar region, and also in the region of the shoulder girdle. There were no actual pains in the joints. Along with these pains he noticed that his muscles were becoming weak, and if he tried to walk he became conscious of weakness in his legs and would have to rest a while before he could go on. His appetite diminished and he lost over a stone in weight. He was not constipated. He stated that, prior to his admission to hospital, his hands and feet were red, and that after a bath, even a very hot bath, his feet would often turn blue.

On examination he was seen to be an average swarthy Italian immigrant. His temperature was raised to 37·8° C. (100° F.) and during his stay in hospital the temperature was irregular, but generally at night it was raised to 37·25° or 37·8° C. (99° or 100° F.). The pulse rate was 110. The tongue was coated and the breath offensive. The teeth were in fair order. No abnormality was detected in the heart or lungs, except tachycardia, which persisted throughout the patient's stay in hospital. The skin was moist with perspiration, which appeared to be constantly present. A generalized erythematous rash was present on the body, and the hands and feet were desquamating but were not swollen. Examination of the abdomen revealed no abnormality, except a scar from an appendicectomy operation performed five years previously. The urine was clear and contained no albumin or sugar. The systolic blood pressure was 120 and the diastolic blood pressure was 90 millimetres of mercury.

Examination of the nervous system revealed very little abnormality. The cranial nerves were all functioning as in health, the superficial reflexes were all present, and all deep reflexes were active. The plantar reflex was flexor in type. All movements were performed by the limbs and no loss of power was demonstrable, but the muscles were flabby and appeared to have lost tone. No tenderness was elicited on deep pressure. A persistent coarse tremor, however, was present in the muscles of the calf, the thighs and the shoulder girdle. The tremor was most marked in the calf and caused a constant twitching of the toes.

Blood examination revealed leucocytosis, the highest count being 27,000 cells per cubic millimetre, and in the differential count eosinophilia was constantly present, reaching at its maximum 31%.

Whilst in hospital the patient presented an appearance of extreme misery. He was depressed, unable to sleep, and complaining always of the burning pain in his hands and feet and of the pain in the legs and back. Sedatives had very little effect on these pains. The erythematous rash gradually disappeared and the sweating lessened to a degree, but the tachycardia and mild fever persisted. The combination of pain, anorexia and insomnia rendered the patient one to be pitied.

At this stage he was transferred to the Royal Melbourne Hospital, where he came under the care of Dr. Graeme Robertson, to whom I am indebted for the various investigations which were carried out at that institution, and which resulted as follows.

There was no reaction to the Casoni test; neither blood serum nor cerebro-spinal fluid gave any reaction to the Wassermann test. The blood calcium content was 13 milligrammes per 100 cubic centimetres of blood. Examination of the cerebro-spinal fluid revealed that the total protein was 48 milligrammes per 100 cubic centimetres of fluid. No reaction was obtained to the colloidal gold test. The fluid was clear and colourless, and there was no increase in globulin. One lymphocyte per cubic millimetre was noticed. The sugar content was 0·06% and the chlorides totalled 736 milligrammes per 100 cubic centimetres of fluid. The blood urea was 24 milligrammes per 100 cubic centimetres of blood.

When the patient was admitted to the Royal Melbourne Hospital his leucocytosis had practically disappeared. The differential count still revealed eosinophilia. The differential count was as follows. Polymorphonuclear neutrophile cells made up 8% of the total leucocytes, polymorphonuclear eosinophile cells 31%, polymorphonuclear basophile cells 1·5%, old metamyelocytes 20%, monocytes 11%, and lymphocytes 28·5%. The hæmoglobin value was 112%. Erythrocytes numbered 6,000,000 per cubic millimetre. The colour index was 0·93. No morphological abnormality was detected in the erythrocytes.

With rest, good nursing and effluxion of time the patient gradually improved. The fever disappeared, the tachycardia left him, appetite came back and all his pain went. He is now apparently perfectly well again; he is working, has put on a stone in weight and is still putting on weight.

Discussion.

A most interesting feature of this case of acrodynia, apart from the age of the patient, was the muscular tremor. This was present in the muscles of the calf, the thigh, and around the shoulder, extending to the upper arm. The tremor was coarse in nature, and in the lower limbs was sufficient to cause twitching of the toes. Rocaz (1933) quotes a case in which a small child developed tremor, fine in quality, when the arm was raised, and goes on to state that myoclonic movements have frequently been reported. He mentions Devic and Daujat, who observed myoclonic movements in a child of five years

suffering from pink disease. The movements reported by these two observers were intermittent in character. The tremor in the patient reported here was constant and not intermittent.

Acknowledgements.

I wish to express my gratitude to Dr. Graeme Robertson and to Dr. Ian Wood for their help and discussions on this patient.

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Reviews.

RECTAL SURGERY.

W. B. GABRIEL has presented us with a second and much improved edition of his book "The Principles and Practice of Rectal Surgery".[1] The print is easy to read, the drawings, simple and coloured, are excellent. Three new chapters have been included and most chapters have been revised.

The new chapter on surgical anatomy goes thoroughly into the anatomy of this region and adds greatly to the value and interest of the treatise. The work of Woollard and Norrish and of Peter Thompson is freely quoted by Mr. Lloyd Davies, the author of this chapter. To older students the description of the sphincteric muscles is striking, and the reader will pass on to Chapter II with due appreciation that the apparently simple act of defæcation is really a most complicated business.

As in the first edition, the importance of thorough examination to arrive at a correct diagnosis is stressed, and all methods of investigation are described. In the chapter dealing with pre-operative preparation wisdom is shown in condemning drastic purgation immediately preceding operation.

As before, local and low spinal are preferred to general anæsthesia.

The important statement is made that only 40% of hæmorrhoids are suitable for injection, which we think is still rather high. Catgut ligation of piles is recommended, and a flatus tube with gauze tucked round it is inserted into the anal canal after operation. Neither of these barbarous adjuncts is necessary after Mitchell's operation, which still is not mentioned.

Prolapse of the rectum is explained and the technique demonstrated for treatment of the simple and the most advanced types. The statement that anal fissure tends to become progressively deeper and more chronic if early and correct treatment is not applied is very true. We agree that to ensure healing after operation for *fistula-in-ano* complete obliteration of the fistulous tract is vital, particularly if there is any bowel connexion.

Pruritus ani and fungoid infections of the anal region are discussed, and it is obvious that to diagnose them accurately an expert bacteriologist versed in this particular subject is necessary.

Injuries to and benign tumours of the rectum are fully described.

Cancer of the rectum is always an absorbing subject in itself, and the statement is made that it comprises 4% of all malignant tumours and, excluding cancer of the stomach, 80% of malignant tumours of the intestinal canal. Cancer of the rectum to those of the cancer age period is therefore an extremely important affliction.

Most surgeons dealing with a cancer anywhere in the body realize that if an operation is undertaken it should always aim at complete eradication of the growth and its lymphatic spread. The author now realizes that the perineal operation cannot reach the upper limits of removable lymphatic spread, and rightly pushes it into the background, but advocates the perineo-abdominal route. To open the abdomen, then to proceed to the perineum to work, and then to return to the abdomen to complete this operation will never be popular nor meet with the approval of the thoughtful student. Experience of most of the operations devised for this region has shown that the perineo-abdominal operation has many faults and limitations. As a routine it must be condemned. A preliminary colostomy is essential in many advanced cases and in debilitated patients. Many almost too ill for even colostomy have after colostomy been able to face excision of the growth and have lived for many years. Again, no matter what precautions are taken, leakage will occasionally take place at or near the anus if much manipulation is necessary; when growths are large and adherent, manipulation cannot be avoided when a surgeon is working in such a confined area. After such a happening would any further procedure inside the abdomen be advisable? Obviously, if a preliminary colostomy has been necessary, leakage is inevitable after all the twisting and turning accompanying the perineo-abdominal operation. Unbiased descriptions of the merits and demerits of the various operative procedures devised for this ghastly complaint would make the author's book without question one of the finest works of its type on rectal surgery.

[1] "The Principles and Practice of Rectal Surgery", by W. B. Gabriel, M.S., F.R.C.S.; Second Edition; 1937. London: H. K. Lewis and Company Limited. Medium 8vo, pp. 374, with 9 coloured plates and 162 illustrations in black and white. Price: 28s. net.

GYNÆCOLOGY.

THE appearance of the second edition of Wilfrid Shaw's "Textbook of Gynæcology"[1] within two years supports our statement in the review of the first edition: that it is "one of the best expositions of modern gynæcology". The splendid illustrations from the works of Peham Aureach and Veit-Stœckel, anatomical and operative, have, of course, been retained, as well as the microscopic plates so valuable in the histological examination of various structures.

There have been many revisions, chief of which is a new chapter on "Hormone Therapy in Gynæcology". Here there is a complete summary of the present state of our knowledge of this subject and a dissection of what has been proved from what is merely surmised. A warning that this treatment is not a "cure-all" is made in the statement that "in sterility only about ten per cent of cases are suitable for hormone treatment"; but that it is of great value is shown by the author's experience in the treatment of menopausal symptoms, *pruritus vulvæ* and *kraurosis vulvæ*, vulvo-vaginitis and vaginitis. Trichomonas is said to respond well. In functional hæmorrhage, at puberty or the menopause, about 25% of patients may be benefited. This is a chapter which will be of value and interest to all practitioners.

The technique of total hysterectomy lacks simplicity and, judging by the author's warnings, the safety of the Worrall technique as practised in Sydney. The division of the round ligaments, as the first step, does not seem to be appreciated. Leaving the upper end of the vagina open, unless infection is present, and passing a gauze pack soaked in tincture of iodine into the vagina from above seems to us an objectionable procedure. The vagina should be rendered aseptic from below when the patient is under the anæsthetic, as a first step in the

[1] "Textbook of Gynæcology", by W. Shaw, M.A., M.D., F.R.C.S., F.C.O.G.; Second Edition; 1938. London: J. and A. Churchill Limited. Medium 8vo, pp. 614, with 4 plates in colour and 253 text-figures. Price: 18s. net.

operation. The same may be said for passing the catheter twenty minutes before instead of at the very beginning of the operation.

In the treatment of prolapse the author gives an importance to pessary treatment which is not accepted in this country. A watch spring ring pessary becomes septic within a few hours. A better procedure for those too ill or too feeble for operative treatment is to teach some member of the family to insert a tampon of wool before the patient rises in the morning and to remove it when she retires at night. In operation for prolapse it is stated: "Although Fothergill's operation gives extremely good results in selected cases it is insufficient for complete procidentia, for which Mayo's operation is most suitable". Our experience has been exactly the opposite. Fothergill's operation is suitable for all ages, provided there is no organic disease. Striking success has been obtained with this operation in a woman, aged seventy-three years, and in many others with complete procidentia. It is also not to be forgotten that Mayo's operation has a certain mortality.

In retroflexion pessary treatment is again given far too prominent a place. The author rightly states that many cases of retrodisplacement cause no symptoms and need no treatment. In operative treatment the author seems to favour Alexander Adams's operation for mobile retroflexion. In our opinion too large a percentage of failures occur with this operation, largely owing to the insertion of the round ligaments into the cornu of the uterus lower down than is usual. In such a case pulling on the ligaments will throw the fundus back and allow the downthrust of intraabdominal pressure to fall upon the anterior surface of the uterus, allowing retroversion to recur. A more certain operation for these retrodisplacements is, when the abdomen is opened, to pull the round ligaments behind the cornu on each side and to suture them there with chromicized gut. This does not interfere with the function of the tube.

There is a very good chapter on radiological treatment in gynæcology. The author states that, as the result of radium or operation is about the same, and as radium has a very slight mortality, this should be the treatment of choice for cancer of the cervix.

In suppurative conditions of the pelvis the author seems to think that when a pelvic abscess bursts into the rectum or is evacuated by vaginal cœliotomy, the condition is satisfactorily ended. Deaths, however, have occurred from neglect to remove the focus which has caused the abscess. The focus should be removed during the stage of apparent recovery, about ten days after the evacuation of the pus.

The author is very conservative in the treatment of acute adnexal operations, although he admits that even with mild catarrhal cases there is always permanent damage to the tubes and ovaries. In our experience the danger is in recurring attacks, each increasing the density of adhesions and rendering future operation more difficult, so that we are inclined to advocate operative interference after a second attack.

One of the best chapters in the book is that on vaginitis. The author rightly states: "Strong solutions of lysol often produce well-marked vaginitis when used in the treatment of leucorrhœa." The technique of vaginal irrigations should be read by all practitioners. The author's favourite solution for irrigation is one containing lactic acid, strength 0·5% (that is, 60% solution), one teaspoonful in each pint of water.

The author uses the term "radiological castration", from the use of radium in young women. This should be taken to heart by all radium enthusiasts. We are sorry to see Auvard's vaginal retractor still illustrated. Its use does tend to over-stretch the pelvic floor and is not necessary. There is an appendix containing the best known preparations used in gynæcological practice. This will be found extremely useful.

On the whole the book is evidently founded upon a wide experience and is an up-to-date guide to gynæcology. The illustrations alone are worth the price of the book.

Notes on Books, Current Journals and New Appliances.

AN INDEX OF DIAGNOSIS.

THE fifth edition of "An Index of Differential Diagnosis of Main Symptoms" has been published.[1] Apparently there is a scope for this unwieldy, austere-looking volume. Dr. Herbert French, in a preface to the first edition, explains that it was written in response to requests for an index of diagnosis which would act as a companion to "The Index of Treatment" published in 1907. The book is an index in that the articles on the various symptoms are arranged in alphabetical order; it is a work on differential diagnosis in that it contains discussions on the methods of distinguishing between the various diseases in which each individual symptom may occur. The body of the book thus deals with symptoms, but at the end of the volume these are gathered together in a general index under the heading of the various diseases in which they occur. The editor lays great stress on the importance of using both parts of the book together. Whether this method of studying disease and of making diagnoses is to be recommended is doubtful. One would be justified in assuming that practitioners who adopted it to any considerable extent were lazy and were not given to reading current journals or any of the excellent books which are published from time to time on progress in the various branches of medical science. At the same time it must be confessed that some of the sections are interesting and that the liberal use of illustrations is most helpful. Used with discrimination, this book may be useful for reference purposes.

PRACTICAL PROCEDURES IN MEDICAL PRACTICE.

THE second of "The Practitioner Handbooks" has been issued; it deals with "practical procedures" of medical practice.[2] It is issued by the publishers acting in conjunction with *The Practitioner*. The chapters are devoted to such procedures as "plaster of Paris technique", blood transfusion, blood counts, treatment in cases of poisoning, circumcision, injection treatment as an aid to surgery, lumbar puncture, syringing the ear, the production of local anæsthesia, and so on. The list of authors includes many well-known medical writers and clinicians. That this book is sponsored by *The Practitioner* is sufficient guarantee of its worth.

A POCKET DICTIONARY.

IN September, 1936, we noted the publication of the fourth edition of "A New Dictionary for Nurses", by Sister Lois Oakes.[3] What appears to be the same book now appears as the third edition of "A Pocket Medical Dictionary" in the compilation of which Sister Oakes has been assisted by Dr. T. B. Davie. This book may still be regarded as a useful volume for nursing trainees.

[1] "An Index of Differential Diagnosis of Main Symptoms", by various authors, edited by Herbert French, C.V.O., C.B.E., M.A., F.R.C.P.; Fifth Edition; 1936. Bristol: John Wright and Sons Limited; London: Simpkin Marshall Limited. Super royal 8vo, pp. 1516, with 742 illustrations, of which 196 are coloured. Price: 84s. net.

[2] "The Practitioner Handbooks: Practical Procedures", edited by Sir Humphry Rolleston, Bt., G.C.V.O., K.C.B., M.D., F.R.C.P., and A. A. Moncrieff, M.D., F.R.C.P., with a preface by Sir David Wilkie, O.B.E., M.D., M.Ch., F.R.C.S., F.A.C.S., F.R.S.E.; 1938. London: Eyre and Spottiswoode Limited, for The Practitioner. Demy 8vo, pp. 293, with illustrations. Price: 10s. 6d. net.

[3] "A Pocket Medical Dictionary", compiled by L. Oakes, S.R.N., D.N., assisted by T. B. Davie, B.A., M.D., M.R.C.P.; Third Edition; 1938. Edinburgh: E. and S. Livingstone. Crown 16mo, pp 417, with illustrations. Price: 3s. net.

The Medical Journal of Australia

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MATERNAL WELFARE.

In a community where maternal and neo-natal mortality rates are not remarkably low there is no need to stress the necessity for more extensive organization of services designed for the welfare of mother and infant. In the past, improvements have mostly consisted in the extension of hospital facilities and the activities of various institutions. These alone are not enough. As long as the maximum attention is centred on hospitals, the hospitals will continue to be crowded with patients of whom many could be adequately dealt with elsewhere. Advances must be made in every activity bearing on the care of the mother and infant. In this issue there appear an address by Dr. A. J. Gibson, as chairman of the Section of Obstetrics and Gynæcology of the New South Wales Branch of the British Medical Association, and the recommendations of the committee appointed by the New South Wales Branch to inquire into maternal and infant welfare. We commend these to our readers' attention. Dr. Gibson lays particular stress on the necessity for the best possible education, not only of the practitioner of obstetrics, but of the nurse, the patient and the public. As he points out, the professor of obstetrics should be able to devote the whole of his time to his professorial duties. The chair of obstetrics at the University of Sydney has been made a whole-time appointment since Dr. Gibson's address was delivered. The rich endowment of a chair at every medical school in Australia, and with it scholarships for research into various obstetric problems, is a requirement of national importance. Few people seem to realize the necessity for obstetric research. Pregnancy and parturition in normal conditions are physiological phenomena; but they are complex in themselves and in their effects, and in abnormal conditions they may cease to be purely physiological, and, as everybody knows, they may be lethal. Much remains to be learnt about them, as about even the simplest physiological process. All the committee's recommendations demand attention. The suggested provision of the services of consultants in obstetrics for people who are unable to pay full fees would be a great advance. Most general practitioners, through training and practice, become skilled accoucheurs; but there are many occasions when they could wish for help from colleagues who, by their special experience, have become familiar with the many obstetric abnormalities and have learnt what should best be done in the interests of mother and child. If a consultant is available, no honest man will hesitate to call him in when uncertain in the face of difficulties. Another very important recommendation is that mobile blood transfusion services should be established. This would be of incalculable value as a means of saving life. It is possible to perform blood transfusion in almost any circumstances; but where no efficient service is readily available, the delay entailed in the preparation for transfusion may be fatal. The scheme outlined in the committee's recommendations would provide for almost immediate blood transfusion, whatever the conditions. There is no need to discuss the individual recommendations further; they are self-explanatory; it now remains for them

to be accepted and for the machinery to be produced to put them into application. There has been much talk about maternal and infant welfare, in all manner of places and by all manner of people; but it seems to be difficult to stir people to necessary action. It is to be hoped that the recommendations recorded here will not merely remain recommendations, but will by a rapid series of actions become realized as part of a stable organization. The next step will be the provision of similar facilities in country districts.

Current Comment.

THE RELATIONSHIP OF GUANIDINE TO PARATHYREOID DISORDER.

It has long been recognized that the manifestations following parathyreoidectomy closely resemble those of guanidine poisoning. From this observation arose the hypothesis that the symptoms of parathyreoid tetany might be the result of increased guanidine formation or of its accumulation in the body. J. E. Andes and V. C. Myers review our knowledge of the subject.[1] They recall that W. F. Koch maintained as far back as 1912 that he had satisfactorily demonstrated an increase in the excretion of guanidine in dogs after parathyreoidectomy. The findings of Koch were corroborated by subsequent observers. However, in the year 1918 L. Bauman and T. Ingvaldsen declared that all previous investigations were almost or quite vitiated by the fact that the methods employed for the determination of the concentration of guanidine in urine converted both creatine and creatinine into guanidine bases. Two years later, L. Findlay and J. S. Sharpe used a method whereby the guanidine in urine is precipitated with picric acid. By this means they confirmed the findings of Koch. In 1926 I. Greenwald demonstrated that the solubilities of the picrates of creatinine, of guanidine and of its methyl derivatives are substantially the same and that separation of these substances by precipitation with picric acid is quite impossible. F. D. White agreed with Greenwald's contentions. Their combined observations indicated that results obtained by Sharpe's methods were of little or no value. In 1927 F. M. Küen employed a method whereby the guanidine in urine is precipitated by picrolonic acid. He admitted that his process was not sufficiently sensitive to detect the presence of small amounts of guanidine, but he was unable to demonstrate the existence of any guanidine in the urine of normal dogs or of those subjected to parathyreoidectomy. In the same year R. H. Major, T. G. Orr and C. J. Weber, employing their new blood charcoal method, failed to discover any definite increase in the blood guanidine of parathyreoidectomized dogs. Subsequent investigators confirmed their findings. Further, G. Berencsy and K. Sinhobel, in a paper published in 1930, asserted that there was no close resemblance between the symptoms of guanidine poisoning and of parathyreoid tetany in dogs. W. W. Swingle and J. T. Nicholas had previously noted that administration of guanidine to parathyreoidectomized animals did not facilitate the occurrence of tetanic symptoms. W. R. Bryan and A. S. Minot observed as recently as five years ago an irregular increase in the blood guanidine of parathyreoidectomized dogs; but in a subsequent report they showed clearly that the high values occasionally observed in animals suffering from parathyreoid tetany were explicable on the basis of dehydration.

Andes and Myers state that the only workers using recent and more accurate methods who have shown any definite relationship between parathyreoid activity and the appearance of guanidine in the blood and urine are A. Remond with H. Colombiés and E. F. Traut with R. P. McFate. Apparently these observers ascertained that parathyreoid extract lowered the blood guanidine in conditions of hyperguanidinæmia. They suggest that the concentration of guanidine in the blood might be regulated in part by parathyreoid activity. In 1932 and 1934 A. S. Minot, H. M. Schumaker and others found that children afflicted with tetany manifested an increase of guanidine in the blood, but they did not ascribe this phenomenon to parathyreoid activity. Various investigators found that hyperguanidinæmia occurred in epilepsy and other neurological conditions, but they did not suggest that any relationship existed between the parathyreoid glands and the hyperguanidinæmia.

Andes and Myers, summing up all the results of experiments so far made, doubted whether any significant change in the concentration of guanidine in the blood or in its urinary excretion occurred in parathyreoid tetany. They made further investigations, using a modified charcoal extraction method. They found that the normal values averaged about 0·24 milligramme of guanidine in each 100 cubic centimetres of whole blood, and varied from 0·18 to 0·28 milligramme. They present the results of blood guanidine determinations in eight human cases of parathyreoid tetany, which followed subtotal thyreoidectomy, and in one case of idiopathic tetany. All the patients suffering from parathyreoid deficiency exhibited definite tetanic manifestations and were being treated with calcium. In some of the cases more than a year had passed since operation. The concentrations of calcium in the serum were subnormal or at the lower limits of normality and the inorganic phosphates tended to be increased. In all the cases the amount of guanidine in the blood was normal. The results of this investigation

[1] *The Journal of Laboratory and Clinical Medicine*, November, 1937.

suggest that in persons suffering from parathyreoid tetany there is no increase of guanidine in the blood, and it is highly doubtful whether symptoms of parathyreoid insufficiency result from an increase of guanidine in the blood or tissues. The patient suffering from idiopathic tetany exhibited normal concentrations of calcium and phosphorus in his serum and a blood guanidine value at the lower limit of normality. Further determinations at a later date yielded similar findings.

These investigations demonstrate how results alter completely and apparent facts are disproved when the old methods are improved or new and more accurate means of investigation are discovered. It is obvious that the attractive hypothesis which attributes tetany to guanidine poisoning must either be held in abeyance pending further research or be totally abandoned. There is no doubt of the toxic nature of guanidine bodies, and particularly of methyl-guanidine compounds. The preparation known as "Synthalin" is one of these compounds and might be employed in diabetes with some advantage were it not for its toxic properties. Discovery of the latest methods of investigating guanidine bodies may also render necessary a review of our knowledge of the effect of guanidine bodies in raising blood pressure and maintaining it at a high level. It has already been found that in patients suffering from hypertension estimation of the guanidine circulating in the blood or excreted in the urine, when compared with normal values, shows no constant variation. It has been suggested that guanidine, when injected into the circulation, becomes taken up by the tissues without loss of its activity. Guanidine certainly lowers blood sugar, and from this fact arose its use in the form of "Synthalin" and "Glukhorment" in diabetes. Much work has yet to be done before we are completely conversant with the properties of guanidine and its compounds.

X RAY THERAPY IN BRONCHIAL ASTHMA.

He would be an optimistic physician who claimed to possess a cure for bronchial asthma, and there is probably no other disease for which so many remedies have been tried and found wanting. But so many are the sufferers from the malady who struggle resignedly through their lives without lasting benefit, that any form of treatment, empirical or not, which offers the hope of relief, should be tried. Such considerations have impelled John M. McEachern,[1] of the University of Toronto, to test the value of X ray therapy in twenty-five cases of the disease.

In the absence of a recognized scientific test there are few standards by which we can judge the improvement, after any particular method of treatment, of an asthmatic's condition. We may be guided to some extent by his subjective sensations, and a reduction in the number of injections of ephedrine or adrenaline furnishes us with some sort of index; but we cannot yet assess the part, and it is a large one, which mental suggestion plays in treatment.

Although the treatment of bronchial asthma by X rays is no new thing, it has not been generally adopted as a routine and is barely mentioned in most text-books. Nevertheless, there are observers who have claimed hopeful results from the method. Without giving details of interest only to the practising radiotherapist, it may be said that McEachern has adopted the plan of exposing the posterior aspect of the patient's mediastinum to the rays, although other workers have strongly advocated the irradiation of the spleen also. Using this technique, McEachern has reported the results of treatment of 25 asthmatics of an average age of forty years. The patients were each given a course of treatment that covered a period of ten days, during which they received two-thirds of a skin erythema dose. In order to obtain the maximum effect it has been thought advisable in many instances to repeat these courses twice or even three times at intervals of a month. It was a striking fact, in McEachern's series of cases, that the asthmatic symptoms became greatly aggravated three or four days after exposure to the rays, so greatly indeed that doses of adrenaline and other agents had to be doubled or even trebled in amount; there was also an enormous increase in the sputum. But after this period the symptoms gradually abated in all successful cases or entirely disappeared. In certain cases, however, no clinical improvement was to be observed until a second or third exposure had been given. How actually the rays effect an improvement in an asthmatical patient's condition is a matter for speculation. By bronchoscopic examination the inflamed, œdematous mucosa of the trachea, larynx and greater bronchi is seen to be heavily coated with thick and closely adherent sputum, of such tenacity that it is with difficulty removed from a test tube. The excessive reaction seen after exposure to X rays supports the assumption that their stimulation of the bronchial glands and mucosa leads to a dilution and a loosening of the tenacious secretions that are a feature in all long-standing cases of asthma. Not improbably, exposure to X rays leads to an ultimate fibrosis and a consequent diminution in the bronchial secretions.

The number of patients who underwent this treatment is perhaps rather too small to enable us to draw certain conclusions as to the value of the method. McEachern states that 24% of the patients experienced an arrest of their symptoms for periods varying between three months and four years, 32% were slightly or moderately improved, while 16% obtained no relief whatever. These figures justify the contention that irradiation, as an easily applied form of palliative treatment, has a place in the treatment of bronchial asthma.

[1] *The Canadian Medical Association Journal*, December, 1937.

Abstracts from Current Medical Literature.

SURGERY.

Treatment of Gall-Bladder Disease.

Harry E. Mock, Clarence F. G. Brown and Ralph E. Dolkart (*Surgery, Gynecology and Obstetrics*, January, 1938) have made a study of the treatment of gall-bladder disease, and conclude that the present-day therapy is inadequate. They have attempted to correlate conservative surgical ideas with medical opinion guided by recent advances in the knowledge of the physiology of the biliary tract. Published statistics concerning the surgical treatment of gall-bladder disease suggest that surgery alone has proved inadequate in a considerable proportion of cases, and the feeling of the authors is that there should be a more prolonged period of observation with a more careful selection of cases requiring surgery. They consider that this, combined with a better understanding of the proper medical management of biliary tract disease would greatly reduce the number of surgical failures. Available data indicate that approximately one-third of all patients subjected to biliary tract surgery show little or no improvement after operation. The authors enumerate as indications for operation in gall-bladder disease, in order of frequency, the following: gall-stone colic, empyema of the gall-bladder, obstruction of the cystic duct, obstructive jaundice, associated pancreatitis, more rarely cholecystitis, and last of all gangrenous gall-bladder. They do not believe that the present-day medical treatment, in which low-fat, low-cholesterol diets are used in conjunction with saline purgatives, has a sound physiological basis, and they themselves use hourly feeding of milk and cream (to present fat in the duodenum) in order to induce contraction and emptying of the gall-bladder, together with ketocholanic acids to stimulate the flow of hepatic bile, and antispasmodic medication to diminish irritability of the gastro-intestinal tract. The authors are of the opinion that gall-bladder drainage should be practised more often than the present-day trend seems to suggest, and give the following indications for cholecystostomy. The first is subacute or chronic pancreatitis with or without cholecystitis or stones, provided that the gall-bladder is not so diseased that it must be removed. The second is the presence of a few stones in the gall-bladder, which on close inspection shows no other abnormality. The fact that it has become a container of stones is not sufficient reason for removing the gall-bladder, and the authors are convinced that the percentage of cures is as high, if not higher, in cholecystostomy than when the gall-bladder is removed. The third indication for cholecystostomy is acute empyema of the gall-bladder, for in this emergency a quick drainage is safer and is preferable to the more prolonged operation of removal. Cholecystectomy is indicated when a diseased, distended, stone-laden gall-bladder is found. In the more severe forms of biliary tract disease it is, and probably will always be, more frequently indicated than cholecystostomy. The authors do not belittle the procedure of removal, but rather enter a plea for more careful individual consideration of every case instead of the subjection of every patient with gall-bladder disease to a routine cholecystectomy.

Bone Metastasis from Carcinoma of the Stomach.

S. E. Lawton (*Surgery*, January, 1938) reviews the literature on bone metastasis from carcinoma of the stomach, and finds it to be a rare condition. Moore found no evidence of bone involvement in 1,600 cases of carcinoma of the stomach, while, at the Johns Hopkins Hospital, Copeland reported seven such cases in 537 carcinomata of the stomach. Southerland found that 1·9% of his 1,032 cases of malignant bony metastasis arose from primary growths in the stomach. In the author's study of 606 cases of carcinoma of the stomach, ten patients presented symptoms of bone pains which might have been attributable to bone metastasis, but in not a single instance did the Röntgenograms reveal any evidence of osseous implants. Even Röntgenograms made after autopsy failed to show any osseous lesion. Yet histological studies revealed definite bone metastasis in three of these cases. The metastasis takes place by the filling of the spaces of the bony framework, and this is considered to be the reason for the difficulty of diagnosis. Neither size, type nor location of the primary growth appeared to have any bearing on the probability of the occurrence of metastasis in bone.

Diaphragmatic Hernia.

Arthur Bowen (*American Journal of Surgery*, January, 1938) has made an intensive review of the subject of diaphragmatic hernia. He points out that it has ceased to be a pathological curiosity and that, with the diagnostic use of radiography, the recognition and operative treatment of this condition is becoming much more common. Since any abdominal organ other than the genitalia, bladder and rectum may be found in the thorax, the symptomatology may be extremely complex and inconsistent. Radiography is the most important single diagnostic aid; it is therefore essential that obscure chest and upper abdominal symptoms be investigated radiologically to exclude diaphragmatic hernia. In children especially, respiratory difficulty and recurrent gastro-intestinal obstructive symptoms should lead to a suspicion of diaphragmatic hernia. The author classifies diaphragmatic herniæ into two groups: traumatic and non-traumatic. The latter may be either congenital or acquired. The left side of the diaphragm is the more common site; the ratio of left-sided herniæ to those occurring on the right side is about twelve to one. In embryonic life the right leaf of the diaphragm closes before the left leaf, and in addition the right leaf is protected by the liver. In the matter of treatment the author states that attempt at operative repair is generally indicated, and the approach may be either thoracic, abdominal or both. Recorded cases seem to indicate that when the stomach only is involved the results are good; and a similar favourable prognosis may be looked for in herniæ of the œsophageal hiatus. The general high mortality frequently quoted is considered by the author to be due to the occurrence of complicating intestinal obstruction and strangulation, and to the employment of treatment only as a last resort. As aids in technique he mentions preliminary phrenicotomy, the passing of a tube through the hernial opening into the thorax to permit air to enter the pleural space and reduce the negative pressure in the chest, preliminary appendicostomy and caecostomy in patients suffering from acute obstruction, and finally, the use of intratracheal anæsthesia.

Intraspinal Injection of Vitamin B_1.

E. L. Stern (*American Journal of Surgery*, March, 1938) presents a preliminary report on the intraspinal injection of thiamine chloride (vitamin B_1) for the relief of intractable pain and for inflammatory and degenerative diseases of the central nervous system. One hundred and twenty intraspinal subarachnoid injections of synthetic vitamin B_1, in doses of 500 to 50,000 international units, were given to twenty-eight patients suffering from a variety of conditions. Natural or synthetic vitamin B_1 administered by mouth, by rectum, subcutaneously, intramuscularly or intravenously may fail to reach the nervous system because of digestion or neutralization by the alkaline intestinal contents, or neutralization by a general alkalosis, or because of the barriers constituted by diseased chorioid plexuses. The beneficial effects of vitamin B_1 appeared much more quickly when it was given intraspinally than when it was given by other routes, and the vitamin remained in the cerebro-spinal fluid for several days. After the intraspinal injection improvement in varying degrees was noted in all cases. All the patients felt better and looked better; appetites were increased, pain was lessened or abolished completely, muscular control improved, speech and gait improved, joints became looser, libido was increased, diplopia was corrected. The greatest degree of improvement observed occurred in a case of von Recklinghausen's disease, while benefit also occurred in

multiple sclerosis, encephalitis, syphilis and poliomyelitis. No patient developed any paralysis, anæsthesia or signs of meningitis following this treatment. Spinal fluid cell counts were not altered appreciably, but the hydrogen ion concentration of the fluid was usually reduced. It was found inadvisable to continue treatment when this concentration fell below 7·0, since restlessness and nervousness tended to occur. Uncontrolled intraspinal administration may cause vitamin B_1 poisoning, which, as demonstrated experimentally, may prove fatal.

Biliary Colic.

R. R. BEST AND N. F. HICKEN (*American Journal of Surgery*, March, 1938) have made observations of the distress caused by increasing the intraductal pressure in the biliary system. In many cases the sphincter of Oddi was found to be contracted when the patient experienced distress in the gall-bladder area, with radiation to the back or to the right shoulder. Attempts to relieve the discomfort or to relax the sphincter by means of morphine were usually unsuccessful, although the pain often eventually disappeared, presumably because of the depressing effect of morphine on the pain pathways. Only occasionally did atropine alleviate the distress or cause the sphincter to relax. The combination of morphine and atropine gave only occasional relief. In view of these findings, glyceryl trinitrate was employed. It was proved by cholangiographic studies that the opaque medium passed from the common duct into the duodenum within ten minutes after 0·0006 gramme (one one-hundredth of a grain) of glyceryl trinitrate was placed under the tongue. The use of this drug was then extended to patients whose gall-bladders had been removed some years previously and who were having recurrent attacks of biliary distress. Some were relieved immediately, although other antispasmodics had not been of much avail. In some cases the actual release of small stones from the common duct was observed. As a result of their studies the authors conclude that glyceryl trinitrate is valuable in biliary colic due to spasm of the sphincter of Oddi, while atropine is more apt to relieve spasm of the cystic duct and neck of the gall-bladder.

Blood Loss in Neurosurgical Operations.

J. C. WHITE, G. P. WHITELAW, W. H. SWEET AND E. S. HURWITT (*Annals of Surgery*, February, 1938) call attention to the problem of blood loss during neurosurgical operations, the excessive bleeding being due to certain regional conditions which are not present elsewhere. Whereas hæmorrhage during an ordinary laparotomy does not exceed 200 cubic centimetres in an extensive intracranial operation an average loss of from 500 to 1,500 cubic centimetres occurs. The authors state that neurosurgical patients rarely show signs of shock until more than 1,200 cubic centimetres of blood are lost, unless, of course, the loss is rapid or damage is done to medullary centres. The authors stress the importance of meticulous hæmostasis and of careful choice of the anæsthetic agent. Both ether and nitrous oxide tend to increase the bleeding. Basal narcosis with local infiltration anæsthesia is suggested. Replacement of the blood lost during any extensive craniotomy is best carried out by a constant intravenous infusion of 5% glucose in normal saline solution. The administration in this way of 1,000 to 1,500 cubic centimetres will balance a gradual loss of one litre of blood. If a sudden brisk hæmorrhage occurs, the apparatus is ready for the administration of citrated blood. It is most important for the neurological surgeon to be able to make a reasonably accurate estimate of the blood loss and to keep it under 1,500 cubic centimetres at each stage.

Carcinoma of the Ampulla of Vater.

W. A. COOPER (*Annals of Surgery*, December, 1937) calls attention to the unquestionably high incidence of carcinoma of the ampulla of Vater at the New York Hospital (0·2% of 3,000 autopsies), reviews the literature on the subject, and describes the condition in full. Radical and wide resection, as advocated by Whipple, is advised. At the first stage, posterior gastroenterostomy, ligation and section of the common duct below the cystic duct, after determination of the patency of the cystic duct, and cholecystogastrostomy are performed. About three or four weeks later the treatment is completed by resection of the affected area, ligation of the pancreatic ducts and suture of the cut surfaces of the pancreas with fine silk.

The Production of Adhesions.

J. K. DONALDSON (*American Journal of Surgery*, January, 1938) has investigated the question of the production of abdominal adhesions as a result of sponging and packing. He performed a series of experiments on animals, leaving small sponges and cotton wool pledgets in the abdomen. He deduced from these experiments that sponging and packing alone did not produce adhesions. He suggests that adhesions may sometimes be caused by the introduction of bacteria into the abdominal cavity at operation.

Breast Deformities.

JACQUES W. MALINIAC (*American Journal of Surgery*, January, 1938) discusses breast deformities and presents notes on the anatomy and physiology of the glands. He points out that in the operation of mastopexy it is important to establish firm attachment of the mammary tissue to the pectoral fascia by means of circular rows of non-absorbable sutures. In reducing the size of the gland he leaves the central portion intact to preserve the blood supply of the nipple and to retain such function as exists in the main central ducts.

Osteochondritis Dissecans.

F. M. CONWAY (*American Journal of Surgery*, December, 1937) discusses the ætiology and pathology of *osteochondritis dissecans*; the knee joint is involved in 85% of reported cases, the elbow joint being next in order, and in isolated cases the ankle joint and the metacarpo-phalangeal articulation are involved. In the knee joint the commonest sites of the disease are the medial condyle of the femur, the lateral condyle, and the posterior articular face of the patella, in that order. Various theories of the causation are discussed, including extra-articular trauma, intraarticular trauma, emboli and "quiet" necrosis from low-grade bacterial infection and from constitutional disturbances, which presuppose an excessive brittleness in the epiphyseal bone leading to a subchondral fracture. He expresses his acceptance of the traumatic theory on account of the frequency of the condition in robust adolescents and in adults actively engaged in vigorous pastimes, and on account of the entire absence of suppuration, together with the inability to obtain growths on attempted culture from excised tissue. On the other hand, those who refuse to accept the theory of traumatic origin point out that in the majority of cases there is an absence of any history of trauma, the onset is insidious and the early signs and symptoms are mild; but the author assumes that a mild injury produces a subchondral fracture which subsequently leads to exfoliation of the fragment, the actual liberation of which he considers may be due to some definite specific trauma. He divides the pathology into three stages, in the first of which there may be only a fairly well demarcated prominence of the articular surface, with an early excavation of the cancellous subchondral portion of the bone. In the second stage the fragment has become distinctly separated, but lies within the excavated area, to which it is attached by a large or small amount of fibrous tissue. The articular cartilage is only loosely attached to the articular end of the underlying bone for a varying distance around the sequestrated focus. The third stage is characterized by the complete sequestration of the fragment, which may remain freely movable in the joint cavity and may become laminated in structure by a process of accretion, or may become attached to the synovial wall of the joint. The excavation gradually becomes filled with fibrocartilage and its outline becomes shallower. There is a special tendency for arthritis to develop in these joints. The treatment of the condition consists in arthrotomy before appreciable arthritis develops.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on October 21, 1937, at Sydney Hospital. The meeting took the form of a number of clinical demonstrations by members of the honorary staff.

Vascular Disease.

DR. GEORGE WILLCOCKS showed a male patient, aged fifty-two years, who was admitted to Sydney Hospital on July 3, 1937. He complained of sore toes of two years' duration, of intermittent claudication of three years' duration, and of the presence of blackening and sores of the toes of the right foot of eight days' duration, and growing worse.

Examination revealed gangrene of the toes of the right foot. The *dorsalis pedis* artery was not palpable in either foot. The right foot was swollen. The systolic blood pressure was 120 and the diastolic blood pressure was 70 millimetres of mercury. The blood serum gave no reaction to the Wassermann test. Diminished sugar tolerance was noted. A blood count revealed that the erythrocytes numbered 3,700,000 and the leucocytes 13,300 per cubic millimetre. The hæmoglobin value was 67% and the colour index 0·9. Of the leucocytes, 72% were neutrophile cells and 28% were lymphocytes.

On July 15 the right leg was amputated above the knee. The stump healed slowly, and the left heel became sore and healed slowly. The patient was given daily injections of "Padutin". To commence, he was given weekly 250 cubic centimetres intravenously of 2% sodium citrate solution.

The pathological report on the right leg gave the following information. It was difficult to distinguish the *dorsalis pedis* artery from the surrounding tissue. The middle third of the anterior tibial artery appeared gritty on section, and the posterior tibial artery appeared gritty on section. The lumen in both tibial arteries seemed to be almost obliterated. Microscopic examination of sections of the middle third of the anterior tibial artery revealed that the wall of the vessel was thickened, all the coats being affected, chiefly the media. The lumen was patent, but decreased in size. No calcification was present. Some sclerosis of the wall of the vein was also observed.

Microscopically, the intima of the posterior tibial artery at the ankle was considerably more thickened than that of the anterior tibial artery. In the lumen an area of fibrous tissue was seen, probably organized blood clot, partly occluding the lumen but showing no canalization. No calcification was present. Microscopic examination of the *dorsalis pedis* artery revealed that the lumen was entirely occupied by fibrous tissue, in which some small cell infiltration was seen. Three blood spaces were present, but these did not resemble the canalization seen in Buerger's disease, nor was any periarterial change present, such as occurs in that condition. Dr. Willcocks pointed out that this patient illustrated the difficulty in diagnosis between Buerger's disease and arteriosclerosis.

Clements's Machine.

Dr. Willcocks also showed an apparatus, designed by Mr. H. I. Clements, for the treatment of occlusive vascular disease by intermittent pressure. The machine was electrical; it inflated a sphygmomanometer cuff fixed round the limb. The pressure employed was 50 millimetres of mercury. This pressure was maintained for two minutes; at the end of that time the apparatus quickly emptied the cuff, and the pressure was relaxed entirely for two minutes. This procedure was automatically repeated for as long a period as was required. Dr. Willcocks remarked that J. J. M. Brown and W. M. Arnott had reported shortly on the use of a similar apparatus in *The British Medical Journal* on May 29, 1937. The apparatus was used in obliterative vascular disease of all kinds, *thrombo-angiitis obliterans*, arteriosclerosis or diabetic affections of the limbs. This method of treatment was based on observations of Lewis and Grant, who found that when the arterial supply of a limb was occluded there resulted a state of vasodilatation lasting from half to three-quarters of the period of circulatory arrest. This dilatation involved both the superficial and deep vessels of the limb, and was independent of the central nervous system and local reflexes. An exactly comparable reaction followed an increase of venous pressure in a limb. It was apparent at as low a pressure as 40 millimetres of mercury, and became more pronounced up to the point of occlusion of arterial flow. Lewis and Grant concluded that the vasodilatation affected the capillaries and smaller arterioles only, and was caused by the accumulation in the extravascular tissue fluids of slowly diffusible substances produced during the period of circulatory disturbance. Dr. Willcocks pointed out that Barsoum and Smirk had shown that a substance like histamine was increased in the venous blood in these circumstances.

Pulmonary Tuberculosis.

DR. E. H. STOKES showed a boy, aged eighteen years, suffering from pulmonary tuberculosis affecting the middle lobe of the right lung. The sputum contained tubercle bacilli and the blood sedimentation rate was 30 millimetres in one hour. Artificial pneumothorax was induced on September 17, 1936, and had been maintained up to the time of the meeting. The X ray photographs revealed the presence of adhesions at the apex of the right lung. Dr. Stokes remarked that, in spite of these adhesions, the patient's progress had been quite satisfactory.

DR. M. P. SUSMAN showed a female patient, aged thirty-two years, who had had induction of an artificial pneumothorax in 1935 for tuberculous cavitation of the upper zone of the right lung. The left lung was clear. The pneumothorax was maintained for several months, but eventually it had to be given up because of severe reactions. The right side of the diaphragm was then paralysed; the cavity became appreciably smaller and apparently disappeared temporarily, but within several months it was again evident. Dr. Susman pointed out that this behaviour of cavities was a well-known occurrence, which might happen even without any active or special treatment. The patient now had about half an ounce of sputum daily, which always contained many tubercle bacilli. Her general condition remained fair, and the left lung was still clear. On August 31, 1936, Dr. Susman performed the upper stage of paravertebral thoracoplasty, portions of the first four ribs being resected, and on September 2 he performed the second stage, portions of the fifth, sixth and seventh ribs being resected. The patient had a severe reaction after the second stage, but eventually made a good recovery.

Her general condition at the time of meeting was satisfactory, and she had only an occasional blob of sputum which was tubercle-free. Radiographic examination showed good collapse of the diseased area of lung.

Diabetes Mellitus Treated with Zinc Protamin Insulin.

Dr. Stokes then showed five patients suffering from *diabetes mellitus*, who were being treated with zinc protamin insulin. The first was a man, aged sixty-five years, who had suffered from *diabetes mellitus* for fourteen years. He had been receiving 25 units daily for the past month. The second patient was a man, aged sixty-one years, who was receiving 30 units daily. The third patient was a woman, aged thirty-eight years, who was receiving 30 units daily. The fourth patient was a woman, aged fifty-four years, who was receiving 20 units daily. The fifth patient, a woman aged fifty-three years, required two injections, 45 units being given in the morning and 24 units in the evening. The progress of these patients had been satisfactory.

Dr. Stokes pointed out the advantage of being able to reduce the number of injections of insulin to one daily in four out of five cases. He also stressed the necessity for giving meals more often than three times daily while the patient was receiving zinc protamin insulin, on account of the variability of the rate of fall of the blood sugar.

Diabetes Mellitus Treated with "Insulin Retard".

Dr. Stokes's last patient was a woman, aged sixty-seven years, suffering from *diabetes mellitus*, who had been treated by means of "Insulin Retard". She was receiving 15 units in the morning and five units in the afternoon. Her progress had been satisfactory. In conclusion, Dr. Stokes pointed out that the same dietary precautions were necessary in patients treated with "Insulin Retard" as in patients treated with zinc protamin insulin.

Hypertrophy of the Left Fibula.

DR. GEORGE BELL showed a male patient who had sustained a gunshot wound and a compound fracture of the lower third of the left tibia in June, 1918. Subsequently chronic osteomyelitis had supervened, with ulceration and formation of a sinus. Numerous operations had been performed. Finally, in May, 1931, the eburnated ends of the tibia at the site of the fracture were excised. At the time of the meeting non-union of the tibia was present; the distal fragment of the tibia had united with the fibula, and the fibula, which had become the weight bearer in the leg, had greatly increased in size. The leg was protected by a medial and lateral iron and a leather sheath. The patient had led an active life, and despite a considerable degree of deformity of the leg had persisted in using it. It was a striking example of Wolff's law.

Actinomycosis.

Dr. Bell's second patient was a male, aged forty-three years, who had been admitted to hospital in England in April, 1919, and had been treated for inflamed glands of the neck, which had been later diagnosed as tuberculous. In 1921 he again came under observation, and the diagnosis of tuberculous cervical glands was made. Radiological examination of the thorax did not reveal any pulmonary abnormality. Again, in 1930, a sinus was found in the right side of the neck and scrofuloderma was present. An abscess formed in the right side of the neck in April, 1936, and in the pus Dr. A. H. Tebbutt found actinomyces. At the time of the meeting the right scapular, cervical and pectoral regions were affected.

Fæcal Fistula with Extroversion of the Caecum.

The third patient shown by Dr. Bell was a female, aged twenty-one years, who had been admitted to Sydney Hospital suffering from extroversion of the caecum following operation for appendicitis. On April 13, 1936, she was ill and complained of pain in the right iliac fossa. On the following morning she still complained of pain in the right side and was suffering from measles. A medical practitioner saw her on April 15, and she returned to her home and went to bed. A week later she was taken to hospital, and a mass was felt in the right iliac fossa. An appendiceal abscess was drained on the tenth day of her illness; a fæcal fistula formed, and she remained in hospital for five months. At the end of this period the appendix was removed and an attempt was made to close the fistula. Seven days after the operation the wound broke down and discharged fæces. A week later prolapse of the caecum had occurred.

On her admission to Sydney Hospital most of the caecum was prolapsed and the ileo-caecal valve was included in the prolapsed portion. The whole of the contents of the small intestine were discharged through the fistula. Ileo-transversostomy had been performed on April 13, 1931, and for some days afterwards most of the motions were passed by the rectum, but the amount so passed became less, and an increasing quantity escaped from the fistula. On June 8, 1937, an operation was performed to close the fistula and was partially successful. On October 21, 1937, a small fæcal fistula still existed and caused very slight inconvenience. The bowels acted normally and the patient had gained weight and her general condition was excellent.

Carcinoma Commencing in a Chronic Gastric Ulcer.

Dr. Bell's next patient was a male, aged fifty-four years. On his admission to hospital on July 31, 1937, he complained that he had suffered pain in the epigastrium at times for two years. It had been worse during the past eight weeks. He had vomited on every alternate day for two weeks, and vomiting had relieved the pain. During the last two months he had lost 6·35 kilograms (fourteen pounds) in weight. He was at this time thin, pale and asthenic. A radiological examination revealed a deformity of the "extreme" pyloric end of the stomach and an early newgrowth or chronic ulcer was suggested as a diagnosis. Little change had occurred in the radiological appearance in four weeks. Occult blood was present in the fæces, and the secretory power of the stomach revealed by a test meal was reported as being within normal limits, but the gastric acidity was less than the average. No abnormal constituents were found. The blood count was normal and no response was obtained to the Wassermann and Kahn tests.

On August 10 partial gastrectomy was performed. The portion of the stomach which was resected bore an ulcer near the pylorus measuring 2·6 centimetres by 1·5 centimetres. Examination of the section by Professor Inglis and Dr. Shearman revealed a chronic ulcer of the stomach with an early carcinoma arising from the chronic ulcer. The lymph glands were not invaded. The patient reported on October 7, 1937, and looked and felt well. He had gained 3·175 kilograms (seven pounds) in weight, and a blood count revealed 4,000,000 erythrocytes per cubic millimetre. Dr. Bell pointed out that the case was of great interest, as it revealed a very early carcinoma arising in a chronic gastric ulcer.

Multiple Fractures.

DR. ARCHIE ASPINALL showed X ray films of a female patient, aged thirty years, who had been injured in an aeroplane accident. The patient had made a good recovery. The films illustrated a compression fracture of the twelfth thoracic vertebra, fractures of the left seventh, eighth and ninth ribs, and of the right fourth, fifth, sixth, seventh, eighth, ninth and tenth ribs, a compound fracture of both bones of the lower one-third of the right leg, and a fracture of the left fibula.

Osteomyelitis.

Dr. Aspinall then showed a male patient, aged forty-five years. He gave a history of injury in 1935, and was treated for rheumatism, but the condition was osteomyelitis of the right femur. In 1936 he was admitted to hospital with acute osteomyelitis of the right humerus; the whole shaft was involved and a spontaneous fracture had occurred. Lymphatic obstruction was present, and the whole limb was enormously swollen. Gradual recovery took place after the sequestra had separated. The patient was shown to illustrate the recovery after the lymphatic obstruction. Dr. Aspinall said that the arm was normal in appearance and the skin was quite soft. The humerus was firmly united.

Rhinoplasty.

Dr. Aspinall's next patient was a female, aged forty-seven years. She had suffered from *lupus erythematosus* at the age of sixteen years, and had been treated with X rays and radium. She developed an epithelioma of the nose. The distal portion of the nose was excised. The skin of the face and forehead was a mass of scar tissue. Rhinoplasty was performed by means of tube grafting in 1933, and the patient was exhibited to show the end result. The various stages were shown by photographs, and the points to be remembered in tube grafting were emphasized. The importance of allowing for shrinkage was well illustrated. An excellent cosmetic result had been obtained.

Exostoses.

Dr. Aspinall's last patient was a male, aged fifty years. He was admitted to hospital with a diagnosis of osteomyelitis. Multiple exostoses were present; tumours were found in the long bones and pelvis. Pathologically, the buds were formed as projections from the end of the diaphysis and continued to grow till diaphysis and epiphysis united. No exostoses were found in bones formed wholly in cartilage.

Lymphogranuloma Inguinale: Nicholas-Favre's Disease.

DR. A. M. MCINTOSH showed a female patient, aged fifty-seven years, who had been admitted to hospital ten years previously complaining of obstinate constipation with occasional attacks of diarrhœa. At times she passed pus *per rectum*, but never any blood. On examination *per vaginam* the rectum was felt as a hard, fixed cylinder about 2·5 centimetres (one inch) in diameter. Rectal examination revealed a constriction of the lumen 5·0 centimetres (two inches) from the anus, which just admitted the tip of a finger. The stricture was dilated; sigmoidoscopic examination revealed an ulcerating area above the stricture, with much purulent discharge. No response was obtained to the Wassermann test. The patient was treated for some weeks with iodides.

On September 21, 1936, she was readmitted to hospital; she had had a constant discharge from the anus for years, consisting of blood and slime. X ray examination revealed general narrowing of the rectum without any obstruction to the barium enema flow. An obvious stricture was found 3·75 centimetres (one and a half inches) from the anus, with pronounced thickening of the recto-vaginal septum. The stricture was dilated and biopsy was carried out; the specimen obtained showed inflammatory tissue without any suggestion of neoplasm. Frei's antigen was injected intradermally, with no result. The antigen was stale, and Dr. McIntosh pointed out that too much reliance could not be placed on this result.

In April, 1937, the patient was readmitted to hospital for colostomy. This gave temporary relief, but recently she had been going downhill. The lesion had invaded the perineum, and the involvement of the posterior vaginal wall was more extensive. Extension had also occurred into the ischio-rectal fossæ, with abscess formation.

Diaphragmatic Hernia.

Dr. McIntosh's second patient was a female, aged fifty-six years, who was admitted to hospital on June 2, 1937. Two years previously she began to suffer from heartburn after all her meals. Vomiting began soon after this and continued at irregular intervals. Occasionally she would vomit food taken two or three days previously. For some months past she had had pain after eating; the pain usually began one hour after meals, and had increased in duration and intensity until at the time of her admission to hospital it was very severe and continued until she vomited. She had no difficulty in swallowing, but felt a desire to vomit any food she ate, and vomiting always relieved her pain. Even drinking water caused the pain, which was usually precordial, but was at times felt under the left shoulder-blade. She ate very little food because of the pain, and had lost fourteen pounds' weight in two years.

X ray examination after an opaque meal revealed a large hiatus hernia. On June 14, 1937, the left phrenic nerve was crushed. On June 17, 1937, a left subcostal incision was made; the left lobe of the liver was mobilized by division of the left portion of the coronary ligament. A large hernia of the stomach was found, due apparently to the absence of the left crus of the diaphragm; the sac admitted four fingers easily. The sac was pulled down and the excess peritoneum was removed. The edges of the hiatus were sutured with thick silk. In the early days after operation some discomfort was caused by distension of the stomach, otherwise convalescence was untroubled. At the time of meeting there was an entire absence of pain or discomfort after eating.

Gunshot Wound of Left Sciatic Nerve.

The third patient shown by Dr. McIntosh was a male, aged thirty-four years, who had been shot in a feud. When admitted to hospital he was found to have complete paralysis of his leg muscles, with extensive anæsthesia. Wounds of entrance and of exit were found at the level of the upper border of the popliteal space. A week later the sciatic nerve was exposed by an incision in the middle of the posterior aspect of the lower part of the thigh. The bullet had perforated the nerve about 1·25 centimetres (half an inch) above its bifurcation, and had severed most of its fibres. The nerve sheath was sutured with black silk. At the time of the meeting foot-drop was still present, but the patient was beginning to recover small movements in his toes. Complete anæsthesia of the dorsum of his foot, partial anæsthesia of the calf and hyperæsthesia of the sole of the foot were present.

Epithelioma tous Ulcer Following Compound Fracture.

Dr. McIntosh's last patient was a male, aged sixty-four years, who had sustained a compound fracture of the left tibia and fibula twenty-two years earlier. He was in hospital two years before union was firm. Ten years previously the leg became inflamed, and an incision was made over the site of the previous injury. It had never completely healed since. Two years prior to the meeting the ulcerating area began to increase in size. It was strapped with slight benefit, but had increased in size greatly in the past six months. The patient suffered much pain in the affected leg, which also swelled considerably if he walked far.

On examination an ulcer 5·0 centimetres (two inches) square, with a raised, fungating surface, hard, indurated edges and an unpleasant discharge was found on the medial aspect of the left leg. On May 26, 1937, the whole ulcer was widely excised and the underlying bone was chiselled off. Ten days later the area was covered with Thiersch grafts, and at the time of meeting it had entirely healed. Biopsy revealed a squamous epithelioma of low malignancy. The patient was free from pain and could walk without disability.

Tuberculous Knee-Joint.

DR. M. P. SUSMAN showed a male patient, aged twenty-three years. Six years previously the patient consulted his doctor because of a feeling of stiffness in the right knee, and wasting of the thigh. At this time there was no pain, and only slight limitation of movement was present. The periarticular tissues were moderately swollen, and a small piece of thickened synovial membrane was removed for biopsy; this revealed chronic granulation tissue. Another piece was injected into a guinea-pig, which developed general tuberculosis in about six weeks. For nine months the patient wore a plaster cast, but pain in the knee was present even when he was at rest, and his general condition deteriorated. Dr. Susman then excised the knee, in July, 1931, with satisfactory results. Union between the tibia and femur, in good position, occurred promptly, and the patient was at the time of the meeting a wage-earner in perfect health. At no time had any other tuberculous lesion been discovered.

Pulmonary Abscess.

Dr. Susman's next patient was a woman, aged twenty-six years, who had had twenty-nine teeth removed under open ether anæsthesia on August 5, 1937, on account of advanced pyorrhœa. She bled severely. Soon after the operation she developed fever, a cough and offensive sputum, pain in the right hemithorax, and general symptoms of toxæmia. She had physical signs of cavitation in the upper part of the right lung on her admission to Sydney Hospital on September 10, 1937. A radiogram revealed a large abscess with a fluid level. The sputum, amounting to six ounces a day on her admission to hospital, contained streptococci and other organisms, but no tubercle bacilli. She had constant fever and tachycardia.

On September 15 Dr. Susman carried out bronchoscopy, and aspirated from the right main bronchus some pus which was apparently coming from the upper lobe bronchus. On September 22, about 5·0 centimetres (two inches) of the third, fourth and fifth ribs were resected in the axilla; the intervening intercostal bundles were doubly ligated and removed, and a roll of gauze soaked in iodine was placed against the exposed endothoracic fascia and pleura and the wound was closed over the gauze pad. The patient was worse for several days after this procedure. On September 29, cyclopropane anæsthesia having been induced by Dr. S. V. Marshall, the wound was reopened. The lung was now firmly adherent to the chest wall. An exploring needle at once found pus, an incision was made

into the cavity and a large tube was inserted. Seven ounces of pus drained off in the first twenty-four hours. The patient still had four ounces of sputum daily, and fever persisted, but about the tenth day sputum and fever both declined. A pleural effusion appeared several days after the operation; this eventually resolved spontaneously.

At the time of the meeting she was afebrile and had very little sputum. Her general condition was rapidly improving.

Malignant Disease of the Jaw.

DR. R. FRANCIS showed a male patient, aged eighty-one years, who had been admitted to hospital with a history of discomfort on the right side of the throat of three months' duration. At first he had had the feeling of a lump on the right side of the throat; later, he could not swallow hard foods. Examination revealed a large cauliflower growth of the right side of the upper jaw, just anterior to the tonsil, which was fixed to the bone. This fixture contraindicated surgical removal of the growth and satisfactory treatment by diathermy on account of the patient's age. Deep X ray therapy was commenced on October 18, 1937. Dr. Francis pointed out that the interesting point was the lack of glandular involvement, which indicated that the site of the growth was from bone and not from the tonsillar fossa, where metastasis was early.

(To be continued.)

MATERNAL AND INFANT WELFARE.

ON January 7, 1936, the Council of the New South Wales Branch of the British Medical Association appointed a committee to inquire into maternal and infant welfare. The committee was composed of the following: Dr. A. J. Gibson (chairman), Dr. J. N. Chesterman (honorary secretary), Dr. F. Brown Craig, Dame Constance D'Arcy, Dr. A. M. Davidson, Dr. L. A. Dey, Dr. T. Dixon Hughes, Dr. E. S. Morris, Professor J. C. Windeyer. We have been asked to publish the committee's recommendations. These are as follows:

It is recommended that the following procedures be adopted. The first three recommendations should be at first limited to the metropolitan district, and should experience show their practicability they could be extended to other parts of the State where conditions and facilities warrant that course.

1. Provision for the services of a consultant when considered necessary by the practitioner, and where the patient is unable to afford the usual fee.

   (*a*) Specialists to act as consultants for obstetric cases should be selected from those who hold (or have held over a considerable period) an appointment in a maternity hospital offering a wide experience of clinical midwifery. A list would be compiled of those consultants willing to cooperate in the scheme and who would be available for consultative or operative service as required by a general practitioner.

   (*b*) Where difficult or complicated labour is encountered, the medical practitioner in charge of the case should obtain the help of a consultant. In this regard it will be necessary to impress upon practitioners the necessity for whole-hearted cooperation in what may be regarded as a national work. It should be realized that the obtaining of a consultant does not constitute a reflection on his ability, but is a step towards an improvement in maternal welfare.

   (*c*) If the patient can afford the usual fee, the choice of consultant is unlimited and the medical practitioner could make his own arrangements. If the patient cannot afford such fee, and if the practitioner wishes, the consultant would be chosen from the list of those who are prepared to attend for a reduced fee, which would be paid by the Government through some central agency, such as the Health Department, as part of its health service to the community.

2. Mobile blood transfusion services should be organized and attached to the Royal Hospital for Women, the Women's Hospital, the Royal North Shore Hospital and such other hospitals as may be deemed necessary. The service should supply a medical officer and nurse, and a complete outfit, packed in sterile drums and containers, of such things as blankets, hot bottles, dressings, drugs, instruments and apparatus for blood or saline transfusion. A blood donor would be called up from a prepared list of donors and taken at once to the patient.

3. Facilities for early bacteriological diagnosis of puerperal pyrexia, followed by the investigation of all hæmolytic streptococcal infections by an approved individual or team.

All practitioners should be exhorted to take a swabbing from the cervix or upper vagina of any patient immediately any rise of temperature to 101° F. occurs during the puerperium. Arrangements would be made for a central laboratory to receive and report on the causal organism. Where a hæmolytic streptococcus is found, satisfactory isolation of the patient would, if necessary, be attended to and an attempt made to trace the source of the infection.

The conduct and organization of these three services will be undertaken by Dr. E. S. Morris, Director-General of Public Health, and details of the scheme have already been put before the Council of the New South Wales Branch of the British Medical Association for their consideration.

4. Investigation of all maternal deaths, with a view to the thorough exploration of all the circumstances of each case. The object of this investigation should be preventive and not inquisitorial, and should be carried out by a small committee representing obstetric specialists, general practitioners and the Department of Public Health.

5. Improvement in educational methods.

   (*a*) Better facilities and organization of post-graduate teaching and experience for doctors and nurses are needed. Regular refresher courses should be instituted in the larger maternity hospitals for this purpose. The attention of the New South Wales Post-Graduate Committee in Medicine should be drawn to the necessity for improvement in methods of and facilities for post-graduate instruction in obstetrics.

   (*b*) A small booklet of advice to pregnant women should be compiled and freely distributed.

   (*c*) Other methods of lay propaganda should be considered.

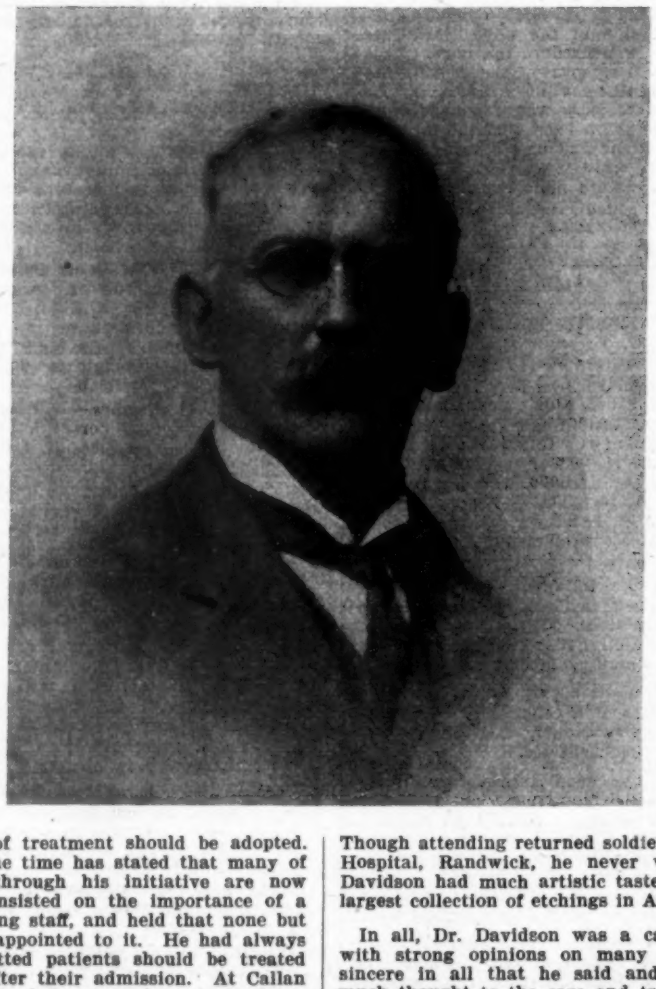
6. The pressing need of monetary grants to obstetric hospitals for the improvement of facilities (structurally and in equipment and staff) for satisfactory routine investigation of abnormalities should be made more evident to both government authorities and the public. This requirement is apart from research needs, and is indeed a preliminary necessity to clinical research.

7. Representation to responsible authorities for the need for relief of economic stress affecting pregnant women in some instances. The investigation of diet and home conditions or need for domestic help could be undertaken by almoners working in the out-patient departments of maternity hospitals. Convalescent homes for recovery in the post-natal period are necessary and would relieve hospital wards.

Obituary.

ANDREW DAVIDSON.

With the death of Dr. Andrew Davidson Australia has lost one of her foremost psychiatrists. Davidson was born at Forres, in the north of Scotland, in 1869. In 1892 he graduated as Bachelor of Medicine and Master of Surgery, and took his degree of Doctor of Medicine in 1899; he graduated with honours. After graduation he began intensive study of the subject which was afterwards to become his specialty. He studied the pathology of the nervous system at Wakefield under the late Bevan Lewis, and nervous diseases at the National Hospital for Paralysed and Epileptics. Subsequently he received an appointment as assistant physician at the Aberdeen Royal Asylum, and he served for a period at Crichton Royal Institution at Dumfries under the late James Rutherford. He was also pathologist and assistant physician at the City Asylum, Birmingham. From Birmingham he was appointed senior physician at the Dorset County Asylum, where for a time he acted as medical superintendent. In 1901 he decided to leave England, and accepted the appointment of port health officer at Singapore. Here he found the work uncongenial and the climate unsuitable. He came to Australia on a visit and soon accepted a senior appointment at the Callan Park Mental Hospital, Sydney. After a period of twelve months he was appointed medical superintendent. Here he showed himself to be an efficient administrator; he improved the classification of patients and insisted that the latest methods of treatment should be adopted. One of his *confrères* at the time has stated that many of the reforms introduced through his initiative are now taken for granted. He insisted on the importance of a well-trained outdoor nursing staff, and held that none but well-tried men should be appointed to it. He had always claimed that newly admitted patients should be treated in bed for three weeks after their admission. At Callan Park this could not be carried out, owing to the large admission rate, but the measure was adopted elsewhere at his suggestion with excellent results. He interested himself in the general life of the hospital, started the church choir, and encouraged the holding of entertainments for the amusement of the patients. He was at this time a good cricketer, but rarely played after he became medical superintendent, though he remained an enthusiastic golfer.



When Andrew Davidson left the department to take up private practice as a consulting psychiatrist, he had already gained the confidence of those who knew him for his sincerity, insight and sympathy. It was but natural that before long his advice should be widely sought. He took an active part in the affairs of the British Medical Association. He became a member in 1905 and remained a member until his death. In 1916 he was elected a member of the Council of the New South Wales Branch and served on the Council continuously until 1931; he was President in 1924-1925. He appreciated and encouraged Australian art, and his collection of pictures and etchings is probably one of the best in the State. He has been described as a strong man, to whom younger medical superintendents in the department were wont to look for guidance, and in later life he was always ready to discuss the latest developments in his specialty. As a result of his wide experience his clinical judgement was sound, and this, with his understanding of human nature, enhanced his reputation. The sympathy of the medical profession is extended to his wife.

Dr. W. H. Coutie writes:

I would like to add my tribute to the memory of the late Dr. Davidson, for whom I had great regard and respect. We first met when I joined the Department of Mental Hospitals, and later on I was closely associated with him for some years at the hospital at Callan Park. He was a man upright in all his doings, and had the respect of those he came in contact with. He was thorough in his work, and little escaped him in the examination of patients or on his hospital rounds. He was a fine administrator, and also disciplinarian.

For some years he was lecturer in psychiatry at the University of Sydney, and retired when Sir John Macpherson came out from Scotland as professor for a short period. Dr. Davidson was in some ways a modest man, averse to any show. Though attending returned soldiers at the Prince of Wales Hospital, Randwick, he never wore his uniform. Dr. Davidson had much artistic taste, and had, I believe, the largest collection of etchings in Australia.

In all, Dr. Davidson was a capable and earnest man, with strong opinions on many things, but was always sincere in all that he said and did. He always gave much thought to the care and treatment of his patients.

JOHN WESLEY HARBISON.

We regret to announce the death of Dr. John Wesley Harbison, which occurred on April 24, 1938, at Hornsby, New South Wales.

Correspondence.

THE INTERPRETATION OF MACLEAN'S UREA CONCENTRATION TEST IN ASSESSING RENAL FUNCTION IN PREGNANCY.

Sir: Miss Vera Krieger's articles of March 26 and April 2 raise many controversial points. Briefly, her contention is that a patient, irrespective of extrarenal disorders, should excrete four grammes of urea in three hours following the administration of fifteen grammes of urea, and that failure to do so indicates renal insufficiency, no matter what the actual concentration of urea may be. She defines normal urea concentration "as any set of figures in which the percentage urea was at least 2·5 in one of the three specimens and in which the volumes were of the order of 100 cubic centimetres in the first hour, and at least 50 cubic centimetres in each of the second and third specimens". She considers a satisfactory concentration of urea *per se* as of no value as a test of renal function. (*Vide* page 562, "Discussion", paragraph 1; also page 564, "Conclusion"; and again, page 564, paragraph 2.)

There is obvious confusion of thought. Miss Krieger does not explain how a diseased organ can do the work of concentrating urea to the extent of 3% or over, or why the kidney should be considered inefficient when, owing to factors outside its own control (for example, action of the so-called antidiuretic hormone), fluid is not available for the production of urine.

There are certain fundamental considerations to be kept in mind when dealing with tests of renal function, which may be specified as follows: (1) Patients must be examined under standard conditions. (2) The kidneys perform several complex functions which are to a large extent independent, and the efficiency of one function is often quite independent of the other functions; for example, the excretion of nitrogenous substances and the excretion of water are to a large extent independent functional activities. (3) Extrarenal factors can influence the concentration and the distribution of water and metabolites in the blood and tissues, and consequent on these extrarenal factors the blood may be changed in a way that can be superficially interpreted as evidence of nephritis; for example, the accumulation of urea in intestinal obstruction *et cetera*. Extrarenal factors also may influence the kidney to excrete a urine that gives evidence that may be interpreted as indicating nephritis; for example, the low specific gravity urine in *diabetes insipidus, et cetera*. The corollary of this is that extrarenal causes must be excluded before labelling any finding as evidence of nephritis. (4) Tests of renal function indicate the functional activity of the kidneys at the time the test is done, and in acute conditions they can give no possible indication of the extent of the ultimate damage the kidney will suffer.

To criticize Miss Krieger's articles along these lines:

(1) *Standard Conditions.*—There was no worth-while standardization of the test material. Food and fluid were allowed up to six hours before the test. The more toxæmic the patient, the more would their diet and fluid intake deviate from those of the normal patients. Miss Krieger admits that the toxæmic patients were encouraged to drink copiously of fluids. No mention is made of whether any individual patient was vomiting, or was refusing fluids, or had been purged. In other words, these patients would have, from patient to patient, very varying amounts of fluid available, and it is quite possible that those who passed small amounts of concentrated urine may have been dehydrated. No mention is made of repeating tests in which, with a good concentration of urea, only a small amount of urine was passed, yet surely in developing a new test and criticizing an old one every care should be taken that the findings are not artefacts. That the excretion of water during the test was less in toxæmic than in normal cases can be considered of no significance unless there was very careful control of the total fluid intake for several days before the test. In practically any disease the fluid excretion may be very small over short periods (for example, in febrile diseases); but this cannot be used as evidence of renal inefficiency.

In Table IV we find under Type 4 (page 560) 206 tests out of 698 had a small volume of urine with a normal urea concentration. According to Miss Krieger all these tests indicate impaired renal efficiency; yet before drawing this conclusion it was not thought worth while to probe the significance of the findings. The simple passing of a catheter in some of the cases who were approaching term may have profoundly affected the urinary volumes.

(2) *Complexity of Renal Function.*—It is impossible to test the kidney for two such divergent functions as urea concentration and water clearance at the same time. It is true that the urea clearance of Van Slyke deals largely with the amount of urea excreted in a given time; but Van Slyke found that he had to make adjustments to make the volume of urine as uniform as possible. He took the square root of the minute volume so as to favour those in whom the excretion of water was small (the square root of numbers less than 1 approaches unity). Van Slyke saw the catch which Miss Krieger missed. In examining a series of cases, normal or otherwise, if special care is taken that practically all available fluid has been excreted before urea is given, some will have so little fluid available that, no matter how high the concentration of urea, the total amount will be low, and *per contra*, if copious fluid is allowed, some will have a low concentration no matter how large the total excretion of urea. The excretion of fluid and the concentration of urea are to a large extent inversely related, and a test that attempts to measure both at once is a bastard test, which gives an inadequate chance for either the true ability of the kidney to concentrate urea or to excrete fluid being at its best.

(3) *Extrarenal Factors.*—The ætiology of toxæmia of pregnancy is poorly understood, but there is evidence of a widespread disturbance of metabolism, so that one should be cautious of labelling any sign or symptom as due to impairment of a particular organ; but Miss Krieger talks glibly of definite nephritis being present solely on the evidence of her test, although the evidence in favour of the state of the kidney function being secondary is extremely strong. In assuming the presence of definite nephritis, Miss Krieger falls into a fatal *post hoc propter hoc* argument. She states, on page 561: "Normal blood urea is maintained as long as one-quarter of the total kidney substance is functioning. Hence, since there is agreement between the high blood urea and decreased excretion of urea in three hours in nearly one-third of the cases of severe toxæmia in spite of the normal concentrating power, one concludes that decreased urea excretion in three hours is a measure of renal inefficiency." The assumption that the blood urea is high because three-quarters of the renal tissue is not functioning is unjustified in a type of patient where there is nausea, anorexia and vomiting, and in which liver derangement may be just as marked a feature as renal derangement. With a somewhat raised blood urea and a good ability to concentrate urea, it is just as logical to contend that the renal efficiency is better than the blood urea *per se* would indicate. A similar state of affairs exists in patients with hypertrophied prostate.

(4) *Renal Tests in Acute Diseases.*—In acute conditions, such as toxæmias of pregnancy, just as in acute nephritis, it is impossible to give a prognosis as to the final state of the kidney. Yet on such grounds Miss Krieger condemns the Maclean test. She says (page 561): "In 13 of the 50 patients whose urea concentration tests revealed normal concentrating power with low total excretion of urea in three hours, later tests indicated renal inefficiency by low concentrating power." She uses the test she condemns to prove her contention, but fails to analyse the final results of patients whose renal function was measured by her own yard-stick. As regards the attack on the urea concentration test in chronic nephritis apart from toxæmia of pregnancy, she brings in new markings for her yard-

stick. Here we read of patients being tested for two hours and not three, but her standard for the normal excretion of urea for such two hours is not given. One gains the impression that her yard-stick is somewhat accommodating. For example: compare the paragraph beginning "In Group IV . . ." on page 599, with the sentence beginning "In this group of tests . . ." on page 560.

In Part II we are taken further into a mass of statistical juggling, in which the material of Part I is minutely dissected. On page 602 appears a statement which cannot go unchallenged: "In this series of 703 urea concentration tests, 241 showed low concentration of urea, and by Maclean's method these would be interpreted as indicating renal inefficiency." No one nowadays would consider the Maclean test to indicate renal inefficiency unless the volume of urine excreted was also taken into consideration.

When the results of tests are divided into six classes with various subclasses, their originator cannot even then interpret the significance of many. One is reminded of the old fable of the cat, the fox and the hounds.

Yours, etc.,

143, Macquarie Street, Sydney,
April 21, 1938.

F. S. Hansman.

Corrigendum.

We have been informed that an error has occurred in the issue of the journal of April 9, 1938, at page 682. It was stated that Dr. Windsor-MacLean had been appointed Chairman and Member of the Medical Board constituted under the *Workers' Compensation (Lead Poisoning, Mount Isa) Act*, 1933, of Queensland. Actually, Dr. Windsor-MacLean has recently resigned from this position, which has not yet been filled.

Diary for the Month.

May 3.—New South Wales Branch, B.M.A.: Organization and Science Committee.
May 4.—Victorian Branch, B.M.A.: Branch.
May 4.—Western Australian Branch, B.M.A.: Council.
May 5.—South Australian Branch, B.M.A.: Council.
May 6.—Queensland Branch, B.M.A.: Branch.
May 10.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
May 13.—Queensland Branch, B.M.A.: Council.
May 17.—New South Wales Branch, B.M.A.: Ethics Committee.
May 18.—Western Australian Branch, B.M.A.: Branch.
May 19.—New South Wales Branch, B.M.A.: Clinical Meeting.
May 24.—New South Wales Branch, B.M.A.: Medical Politics Committee.
May 25.—Victorian Branch, B.M.A.: Council.
May 26.—New South Wales Branch, B.M.A.: Branch.
May 26.—South Australian Branch, B.M.A.: Branch.
May 27.—Queensland Branch, B.M.A.: Council.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages xvi-xix.

Aramac Hospital, Aramac, Queensland: Medical Officer.
Commonwealth Serum Laboratories, Melbourne, Victoria: Medical Officer.
Government of North Borneo: Medical Officer.
Royal Melbourne Hospital, Melbourne, Victoria: Medical Superintendent.
Royal North Shore Hospital of Sydney, New South Wales: Honorary Assistant Gynæcological Surgeon and Obstetrician.
Tambo Hospitals Board, Tambo, Queensland: Medical Superintendent.
The Mount Morgan Hospital, Mount Morgan, Queensland: Resident Medical Officer.
The University of Sydney, New South Wales: Post-Graduate Lectureships in Anæsthetics.
Women's Hospital, Melbourne, Victoria: Pathologist.

Medical Appointments: Important Notice.

Medical practitioners are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
New South Wales: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
Victorian: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
Queensland: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
South Australian: Secretary, 178, North Terrace, Adelaide.	All Lodge appointments in South Australia. All contract Practice Appointments in South Australia.
Western Australian: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.

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